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TECHNICAL REPORT ABSTRACTS

1973 - 1979

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TECHNICAL REPORT ABSTRACTS

MARITIME ADMINISTRATION RESEARCH AND DEVELOPMENT 1973 — 1979

Prepared By

CADCOM

A Division of ManTech International Corporation

Annapolis, Maryland 21401

May 1980

Prepared For

U.S. DEPARTMENT OF COMMERCE MARITIME ADMINISTRATION

OFFICE OF COMMERCIAL DEVELOPMENT

U.S. Department Comm

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USING THIS VOLUME

The purpose of this volume is to provide access to research reports generated by, participated in, and completed for the Maritime Administration during the years 1973-1979. All entries in this document are available for review at MarAd's research and development library or for purchase either from the National Technical Information Service (NTIS) or the Government Printing Office (GPO). The availability source is identified in the entry itself. When ordering a publication, be sure to include the title, date, author, and any accession material (such as order number) provided in the abstract entry. The instruction for purchasing documents from NTIS includes: "Repr. PC: Req. Price." These designations represent: "Reproduce paper copy" and "Request Price." NTIS numbers are provided wherever possible and should be used along with correct and complete titles when ordering documents. The following mailing addresses correspond to the three means of obtaining copies of reports cited in this volume.

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Maritime Administration
U.S. Department of Commerce
14th & E Streets, N.W.
Washington, D.C. 20230
Telephone (202) 377-4113

This volume is divided into four sections:
White pages—abstracts of research reports, yellow pages—index to abstracts by subject, pink pages — index to abstracts by author/investigator, and the blue pages — index to abstracts by publisher/performing agency.

White pages — Abstracts of research reports are grouped into 24 different categories. The area of interest covered by each category is given on pages vii and viii. The category numbers and titles are printed in bold type at the top of each page in the white section.

Yellow pages — A subject index lists each abstract by report (reference) number and the category in which it can be found. The report (reference) numbers are assigned by the Maritime Research Information Service (MRIS) and are printed by ascending number within each category.

Pink pages — An author/investigator index lists abstracts by report (reference) number and the category in which it can be found. Because specific authors are not always identified with reports, this index does not apply to all documents.

Blue pages — A publisher/performing agency index also lists abstracts by report (reference) number and the category in which it can be found.

TOPICS COVERED BY SUBJECT AREAS

01 Arctic and Cold Weather Operations
Arctic operations, cost effectiveness, domestic ice operations, ice breaking, ice prevention, iceberg detection, model testing

02 Air Conditioning, Heating, and Refrigeration
Control devices, compressors, condensers, diffusers, ducting, evaporators, fans and motors, heating equipment

03 Auxiliaries
Anchor machinery, general equipment, machinery and support systems including deck machinery and steering gear machinery, desalination and distillation equipment

04 Cargo and Materials Handling
Automation, cargo handling and stowage, cargo properties, claims prevention, commodity form change, computer applications, containers, conveyors, cranes, lighters, self-unloading equipment, slurry transport techniques, unitized cargo

05 Corrosion, Fouling, and Protection
Cavitation erosion, coatings and adhesives, corrosion and control, cost effectiveness, environmental effects, fouling protection, measuring techniques, noncorrosive alloys, paints, primers, surface preparation, wood preservatives

06 Electric Generation and Distribution
Alternators, batteries, generators, lighting systems, switchboards and controls

07 Experimental Ships and Special Type of Craft
Barges, cargo submarines, catamarans, dredges, dynamically positioned vessels, ferryboats, hydrofoil craft, offshore drilling rigs, surface effect ships, towboats, tugs, water-jet-propelled craft

08 Lubrication, Fuels, and Combustion Technology
Exhaust gases, fossil fuels, fuel systems, greases, hydraulic fluids, lubricating oils and systems, nuclear reactor fuels

09 Management and Advance Planning
Administrative techniques, capital investment, decision making, finance, forecast technology, information systems, long-range planning, management science, profitability, research management, risk analysis, studies of advanced transport systems, subsidies

10 Maritime Labor, Education and Training
Collective bargaining, compensation, educational curricula, labor relations and contracts, manning requirements, productivity, training establishments, training programs

11 Marketing and Traffic Management
Commodity statistics, computer applications, documentation, freight forwarding, freight rates, marketing research and planning, sales management

12 Materials
Acoustic insulation, asbestos, brick, cement, ceramics, concrete, FRP, ferrous and nonferrous metals and alloys, fibers and matrixes, fiberglass, glass, graphite, inspection of materials, paper, plastics, porcelain, rubber, sealers, textiles, thermal insulation, wood

13 Navigation, Communications, and Detection
Collision avoidance, communication equipment, data communications, depth-measuring equipment, harbor advisory radar systems, inertial navigation systems, infrared, integrated systems, lasers, meteorological instruments, navigation instruments, navigation satellites, navigational aids, omega, piloting, radar, speed-measuring equipment

14 Pollution Abatement and Control
Acoustic absorption, acoustic insulation, detection and monitoring devices, environmental data management, human reaction to noise, noise control and reduction, oil containment, oil removal, oil spills, sanitation, sewage disposal, sewage treatment, smoke, sound transmission, sources of sound, stack gases, vibration damping

15 Ports and Terminals
Breakwaters, bridges and constraints, dredging, lakes and inland waterways, lighting, offshore cargo facilities, offshore moorings and mooring systems, piers, pipeline construction, port descriptions, port management, shoreside cargo facilities, terminals, warehouses

16 Propellers, Gear Trains, Shafting, and Couplings
Bearings, cavitation, couplings, gear tests and measurement, gears (including housings and foundations), hydrodynamics, nozzles, propeller blades, propellers, seals, shaft alignment, shafting systems, stern tubes, stuffing boxes, thrusters

17 Propulsion Machinery
Boilers, capital costs, diesel engines and other internal combustion engines, electric propulsion, engine maintenance, gas turbines, heat balance, nuclear plants, reciprocating and rotating combustion engines, steam turbines, instrumentation and control devices, vibration measurement, water-jet propulsion

18 Safety and Damage Control
Buoyancy, decontamination systems, fire detection, fire extinguishing equipment and systems, fire fighting, fire prevention, floodability, lifesaving equipment and methods, nuclear reactor safety, signaling equipment, safety regulations and standards, stability, tank cleaning and gas freeing, surveys, ship classification

19 Ship Construction, Conversion and Repair
Automation, computer applications, cost effectiveness, docks, launching, management science, mechanization, outfitting, production techniques, quality control, salvaging, shipbuilding trends and forecasts, shipyard materials handling, subassembly, subsidies, welding methods and equipment

20 Ship Design and Analyses
Computer-aided ship design, data management, design budgeting and control, buoy hydrodynamics, economic analysis, general arrangements, hull geometry, hydrodynamics, hydrostatics, instrumentation, life-cycle costing, load criteria, model testing, reliability, ship descriptions, structural components, technical information systems, value engineering, wave measurement, vibration analysis

21 Ship Handling and Control Systems
Automation, braking, computer simulation, course stability and control, human factors engineering, integrated ship control, maneuvering, model testing, operational procedures, rudders, seakeeping, ship motions, ship response, ship trials, slamming, towing

22 Ship Operation
Chartering, cost analysis, maintenance, marine insurance, maritime law, operations analysis, subsidies, ship management, weather forecasting and routing

23 Strength of Materials and Structural Analysis
Chemical composition, compressive properties, creep properties, ductility, elastic properties, fatigue, fracture, hull instrumentation, hydro-elasticity, nondestructive tests, plasticity, tensile properties, toughness, weldability

24 Trade Development and International Commerce
Acts, customs regulations, customs tariffs, economic benefits, foreign competition, institutional constraints, intermodal systems and regulations, international conventions, legislative requirements, shipping codes, subsidies, tax concessions, trade trends

SAMPLE ABSTRACT

MRIS reference number → 199419

Title → EVALUATION OF THE TRANSIM LOW—COST SATELLITE NAVIGATION SYSTEM

Author → Densler, DW

Publication Source → Applied Physics Laboratory of the Johns Hopkins University, Laurel, Maryland

Publication data → Final Report, MA-RD-900-7402, May, 1973, 267 pp.

Abstract → This report discusses the joint Applied Physics Laboratory/Maritime Administration evaluation of the TRANSIM Low-Cost Satellite Navigation System . . .

Acknowledgment → NTIS
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DEFINITIONS AND ABBREVIATIONS

AFCRL	Air Force Cambridge Research Laboratories
AFL/CIO	American Federation of Labor/Congress of Industrial Organizations
AINA	Arctic Institute of North America
ANL	Argonne National Laboratory, Illinois
API	American Petroleum Institute
APL/JHU	Applied Physics Laboratory/Johns Hopkins University
ASCE	American Society of Civil Engineers
ASNE	American Society of Naval Engineers
BCF	Bureau of Commercial Fisheries
BISI	British Iron and Steel Industry Translation Service
BSRA	British Ship Research Association
COE	Corps of Engineers, U.S. Army
COM	Prefix identifying an NTIS accession number
COSATI	Committee on Scientific and Technical Information
CPFF	Cost Plus Fixed Fee
CTS	Consolidated Translation Survey
CASO	Council of American Steamship Operators
DDC	Defense Documentation Center
DIA	Defense Intelligence Agency
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
EI	Engineering Index
EPA	Environmental Protection Agency
ESL	Engineering Societies Library
FWPCA	Federal Water Pollution Control Administration
FWQA	Federal Water Quality Administration
JPRS	Joint Publications Research Service
MARAD	Maritime Administration
MIC	Maritime Information Committee-National Research Council
MRIS	Maritime Research Information Service
MTRB	Maritime Transportation Research Board
NAE	National Academy of Engineering
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NBS	National Bureau of Standards
NIC	Naval Intelligence Command Headquarters
NMRC	National Maritime Research Center

NOAA	National Oceanic and Atmospheric Administration
NODC	Navy Oceanographic Data Center
NOIC	Navy Oceanographic Instrumentation Center
NOO	Naval Oceanographic Office
NRC	Nuclear Regulatory Commission
NRL	Naval Research Laboratory
NTIS	National Technical Information Service
ORNL	Oak Ridge National Laboratory
OTEC	Ocean Thermal Energy Conversion
PB	Prefix identifying an NTIS accession number
PMY	Professional Man-Years
Repr:PC	Reproduced paper copy of original document
Req Price	Price on Request
SCA	Shipbuilders Council of America
SSIE	Smithsonian Science Information Exchange
SNAME	The Society of Naval Architects and Marine Engineers
TRIS	Transportation Research Information Service, National Academy of Sciences
UCLLL	University of California, Lawrence Livermore Laboratory
USCG	United States Coast Guard

048408
ICE STRENGTHENING OF GREAT LAKES ORE CARRIERS -- A COMPUTER-AIDED ANALYSIS

Kaldjian, M

Michigan University, Ann Arbor, Michigan 48104

Jan 1973, 24pp

The object of the study is to establish a widely applicable procedure for estimating the economic benefits to ship owners by extending the Great Lakes operating season in the movement, essentially, of pelletized iron ore. A computer program calculates the additional steel weights necessary to reinforce a vessel for ice.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $3.00 COM-73-10932; Microfiche $1.45.

050841
FULL SCALE TESTS OF GREAT LAKES BULK CARRIER LEON FRASER IN ICE FIELDS 1972-73. PART I: TRIAL MANUAL

Voelker, RP

ARCTEC, Incorporated, 9104 Red Branch Road, Columbia, Maryland 21045

Final Report, TR-0051-5, Feb 1973, 92pp

The objective of this full scale test program is to determine if the ice resistance of Great Lakes bulk carriers can be reduced with an air coating, or bubbler system. The report describes the preparations for the testing of an experimental system aboard the U.S. Steel Corporation's ore carrier LEON FRASER. The Trial Manual describes the test plan, procedures, organization and schedule. (Modified author abstract)

NTIS

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050842
METHODS TO IMPROVE GREAT LAKES BULK CARRIER PERFORMANCE IN MUSH ICE FIELDS AND CLOGGED CHANNELS. VOLUME I

Voelker, RP Levine, GH

ARCTEC, Incorporated, 9104 Red Branch Road, Columbia, Maryland 21045

Final Report, TR-00371, Vol-1, April 1972, 118pp

The objective of this research program was to determine methods to improve the performance of Great Lakes bulk carriers in broken ice fields during the winter and spring seasons. Phase I was directed toward the development of realistic models of the actual ice conditions prevailing in the bottleneck areas and to the examination of the behavior of a model of an existing bulk carrier under these conditions. Phase 2 was directed at developing methods for reducing bulk carrier resistance in mush ice and clogged channels employing air bubbler systems, waterjet systems, detachable icebreaking type bow, detachable bow with two propellers, and detachable bow of special design. The results are presented in terms of full scale ship performance.

NTIS

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153811
GREAT LAKES ORE CARRIER SERIES ICE RESISTANCE MODEL TESTS -- DRAFT VARIATION

Virtanen, J Johansson, B Makinen, E

Wartsila Shipyard, Helsinki, Finland 00151

Final Report, MA-RD-940-77080 April 1975, 90pp

This work is an extension of the test series reported in WIMB Report No. 18 "Great Lakes Ore Carrier Series Ice Model Test Program" which covered model tests of nine different hull forms of which eight formed a systematic series with bow form, ship length and ship beam as parameters. This report covers the testing of two draft modifications for one hull with bow angles and main dimensions kept constant.

Maritime Administration

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159252
GREAT LAKES ORE CARRIER SERIES ICE RESISTANCE MODEL TEST PROGRAM. METHOD FOR PREDICTING LEVEL ICE RESISTANCE OF SHIPS WITH MAIN DIMENSIONS TYPICAL FOR THE GREAT LAKES BULK CARRIERS

Roos, A Juurmaa, K Syrjala , H Makinen, E Mentz, PB

Maritime Administration, Washington, DC 20230

WIMB-Test-41, 34pp

This report contains a summary and conclusions from the ice breaking model tests of a systematic model series. The results of model tests are combined into one mathematical expression. With the expression it is possible to make ice resistance predictions for ships with different main dimension ratios and hull forms.

NTIS

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166269
RESULTS FROM TWO YEARS OF TESTING A GREAT LAKES ORE CARRIER IN ICE FIELDS. VOLUME I

Levine, GH Voelker, RP Kotras, TV Kosterich, PP Peter, JJ

ARCTEC, Incorporated, 9104 Red Branch Road, Columbia, Maryland 21045

0127-3, Vol-1 153pp

The effectiveness of an air coating system to reduce ore carrier resistance in brash ice fields and the ice forces on the bow of a Great Lakes ore carrier are presented as a result of a two year test program. Design of the air coating system and the ice force measurement system are described including the subsequent shipyard modification. A sample calculation to determine the economic benefits versus cost is also presented.

NTIS

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168741
GREAT LAKES WINTER NAVIGATION. TECHNICAL AND ECONOMIC ANALYSES. VOLUME 1. METHODS OF EVALUATION

Nowacki, H Benford, H Atkins, A

Maritime Administration, Washington, DC 20230

Final Report, 7319, MA/RD—940—77109, 173pp

This volume explains the procedure that has been developed for predicting the economic performance of Great Lakes bulk carriers operating in extended seasons of various lengths. The technique is versatile. It can analyze almost any combination of design parameters, trade routes, and ship status (i.e., proposed, existing, or existing but to—be—modified). The new tax deferral privilege is incorporated into the analysis, and a wide selection of measures of merit is available. The computerized portion of the work deals with the economics of any given individual ship. There are, however, brief sections in the report describing analytical techniques for optimizing fleet operations and for assessing the economic gains resulting from reduced inventory requirements. Four subsequent volumes describe the details of the computer program, draw some preliminary conclusions from parametric studies based on the program, explain a rationale for structural design for ice navigation, and report on conclusions reached from a methodical series of strength tests carried out on ferro—cement reinforced steel plates.

NTIS

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186682
RESEARCH PLAN FOR ARCTIC SHIP POWERING AND DEVELOPMENT

ARCTEC, Incorporated, 9104 Red Branch Road, Columbia, Maryland 21045

Final Report, Dec 1977

This report examines and documents the basis for an Arctic surface ship transportation system, and identifies the major elements of a research program designed to upgrade the state—of—the—art of Arctic marine transportation technology. The study identifies seven research projects as having the greatest priority for U.S. industries. In descending order of interest, these are: 1) Sea Ice Conditions Along Alaskan Routes, 2) Ice Resistance Formulation From Past Experiments, 3) Model and Full Scale Ice Resistance Correlation, 4) Ice Forces on Ships (Full Scale Data Collection), 5) Parametric Ice Resistance Model Tests, 6) Develop Advanced Marine Electric Transmission System, and 7) Conduct Systematic Tests on Maneuverability. For each of the projects, a program element statement was prepared which describes the objective of the project, plan of action, end product, benefit, schedule, and budget estimate.

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199338
ARCTIC MARINE COMMERCE STUDY: VOLUME III

Faylor, R Fishbein, S

Arctic Institute of North America, Washington, DC

Final Report, MA—RD—900—7409, Aug 1973, 44pp

Contents: cargo forecast; Alaskan economy — overview and prospects; Alaska and international economy; ports and intermodal service; financial considerations of port development; Arctic development policy; pipelines; international legal and regulatory considerations; advanced Arctic marine technology; fleet requirements.

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199339
ARCTIC MARINE COMMERCE STUDY: VOLUME II

Faylor, R Fishbein, S

Arctic Institute of North America, Washington, DC

Appendix, MA—RD—900—74028, Aug 1973, 298pp

Contents: ice resistance; ice strengthening; ice information; computer programs; offshore terminal and harbor construction; liner operations, shallow draft shipping, and inland distribution; Alaskan affairs and Arctic marine commerce; advanced arctic marine technology.

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199340
ARCTIC MARINE COMMERCE STUDY: VOLUME I

Faylor, R Fishbein, S

Arctic Institute of North America, Washington, DC

Final Report, MA—RD—900—74027, Aug 1973, 333pp

The Arctic Institute of North America, under the sponsorsip of the Department of Commerce, Maritime Administration, and with the help of industrial and Alaskan communities, performed a comprehensive study to determine the future requirements for Arctic Marine Commerce. These requirements establish a basis for prediction of and planning for all aspects of marine commerce in the Alaskan Arctic to the year 2000. In developing these requirements, the study was quantitative and analytical, with emphasis on important and practical economic and social values.

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199347
ARCTIC SUBMARINE TRANSPORTATION SYSTEM: VOLUME VI: SYSTEM DEVELOPMENT AND SUPPORT REQUIREMENTS

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

Risk Analysis Report, N—4—ASTS—Vol.6, Jan 1975, 64pp

This report is a risk analysis study, divided into four categories: technological, social—psychological, political, and economic. No technical hazards emerge as serious risks. Environmental hazards and the atomic submarine technology transfer are regarded as possible problem areas. Political hazards are considerable. Economic risk potential has to be faced. Factors associated with investment appear very favorable.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number N—4—ASTS—Vol.6.

199348
ARCTIC SUBMARINE TRANSPORTATION SYSTEM: VOLUME VII: PERSONNEL ACQUISITION AND TRAINING PLAN

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

Final Report, N—4—ASTS—Vol.7, C.2, Jan 1975, 165pp

The submarine tanker has no predecessor and requires a fresh evaluation of ships crew and organizational duties. The plan developed by the study recommends changes in traditional ships organization and integrates the operation of the vessel, submerged docks, and off—shore terminals into one personnel system. An active career advancement program is included in the concept to retain the qualified personnel on the job.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number N—4—ASTS—Vol.7, C.2.

199349
ARCTIC SUBMARINE TRANSPORTATION SYSTEM: VOLUME V

Newport News Shipbuilding & Drydock Company, Newport News, Virginia, 23607

Cost Analysis Report, N—4—ASTS—Vol.5, Jan 1975, 127pp

An economic analysis was made of each of the six submarine tanker transportation systems described in Volume I. These analyses were based on estimated costs for the system configurations developed in this study. Proper contingency allowances have been included for uncertainties created by lack of knowledge of such things as terminal site conditions, characteristics of the oil to be transported.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number N—4—ASTS—Vol.5.

199350
ARCTIC SUBMARINE TRANSPORTATION SYSTEM: VOLUME IV

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

Technical Analysis Report, N—4—ASTS—Vol.4—PT.2, Jan 1975, 323pp

The study defines concepts for docking and loading submarine tankers of 2,000,000 bbl capacity at the northern terminal located seaward of Prudhoe Bay, Alaska, as well as concepts for docking and unloading submarine crude oil tankers of 2,000,000 bbl capacity at a U.S. East Coast Terminal at Cape Charles, Va. The third portion of the design analysis develops a conceptual design for a transshipment terminal at Vestfjord, Norway, located in sheltered water where transshipment of crude oil from the Arctic can be effected between the submarine tankers and surface tankers.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4484, Washington, DC, under reference number N—4—ASTS—Vol.4—RT.2.

199388
ARCTIC ENERGY TRANSPORT STUDY

Maritime Administration, Washington, DC 20230

Executive Summary, M—3—AETS—ES, Apr 1973, 83pp

This document summarizes a two month effort to identify sources of other agency funds to support basic research and development activities identified in MARAD's Arctic Energy Transport Study. The basic objective of this concept study was to evaluate the economic and technical feasibility of moving bulk crude oil from the Arctic via the Atlantic Ocean, and secondarily, the Pacific Ocean, to the U.S. Considered individually or in collective arrangements were pipelines, tunnels, surface ships, and submarines.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number M—3—AETS—ES.

199389
ARCTIC ENERGY TRANSPORT STUDY: SURVEY OF GOVERNMENT FINANCING MECHANISMS

Adler, SC

National Bureau of Standards, Technical Analysis Division, Gaithersburg, Maryland

Survey Report, M—3—AETS—S, March 1973, 76pp

This document summarizes a two month effort to identify sources of other agency funds to support basic research and development activities identified in MARAD's Arctic Energy Transport Study. The basic objective of this concept study was to evaluate the economic and technical feasibility of moving bulk crude oil from the Arctic via the Atlantic Ocean, and secondarily, the Pacific Ocean, to the U.S. Considered individually or in collective arrangements were pipelines, tunnels, surface ships, and submarines.

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This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number M—3—AETS—S.

199392
ARCTIC SUBMARINE TRANSPORTATION SYSTEM: VOLUME II

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

4—37032

This volume covers the actions required to implement the conceptual design of a submarine transportation system for delivering crude oil from the arctic basin to the U.S. east coast. System postulates, assumptions and rationale are presented and system composition and boundaries are defined. Candidate systems are described, methods of construction and acquisition are discussed and detailed subsystem schedules presented. Summary implementation schedules for three selected operational systems are presented and a critical assessment of them is given.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number N—4—ASTS—Vol.II.

199393
ARCTIC SUBMARINE TRANSPORTATION SYSTEM: VOLUME I

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

Executive Summary, N—4—ASTS—Vol.I, 1975, 56pp

This study shows that nuclear submarine tanker systems can provide a feasible and economically attractive means of transporting arctic oil to the U.S. east coast market. In addition, they can serve to improve U.S. energy self—sufficiency and balance of trade. System performance requirements were based on potential Arctic Basin crude oil sources and production rates. The characteristics and composition of candidate transportation systems were then chosen to best meet these performance requirements using existing U.S. technology.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number N—4—ASTS—Vol.I.

199394
ARCTIC SUBMARINE TRANSPORTATION SYSTEM: VOLUME III: ENVIRONMENTAL IMPACT ANALYSIS

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

Environmental Report, N—4—ASTS—Vol.III, Jan 1975

This report, which addresses the area of environmental impact of the Submarine Tanker Transportation System Study, has three aims: 1) to report the analysis of the system and the recommendations generated, 2) to provide a starting point for preparing the Draft Environmental Impact Statement, and 3) to begin establishing a basis for dealing with criticisms.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number N—4—ASTS—Vol.III.

199395
ARCTIC SUBMARINE TRANSPORTATION SYSTEM: VOLUME IV: TECHNICAL ANALYSIS

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

Analysis Report, N—4—ASTS—VolIV,PT.1, Jan 1975, 323pp

This study pre—supposes that there is a viable role for an underwater oil tanker to play in the transportation of crude oil from Arctic lands and the Arctic Ocean Basin to the east coast of the U.S. Study objectives develop transportation concepts to the extent necessary to measure their technical feasibility and economic appeal. Scenarios essential to the formulation of the submarine tanker system include: 1) a picture of oil production in the Arctic for production rate, typical oil pool production histories, and time frames, 2) a projection of energy consumption and refining capacity on the east coast, 3) a transshipment mode of transport to illustrate international impact on a candidate system, 4) a sequence of tanker operations at a loading or unloading terminal for traffic control, and 5) a trans—arctic under ice route for contingency analysis and communication.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number N—4—ASTS—Vol.IV,PT.1.

199397
AN ARCTIC SUBMARINE PORT FACILITY

Drewry, JM French, S Reed, JC

Arctic Institute of North America, Washington, DC

Final Report, A—7—ASPF, Apr 1973, 64pp

This report evaluates transportation facilities as a major component of the total costs of extracting and transporting Arctic resources versus the relative costs of other sources of supply. It examines incentive, the ability, the legal implications, and the opportunities of Alaska natives participating in the planning, financing, constructing, managing, and operating of a segment of a system or facility to deliver oil, and possibly, later, liquefied natural gas, from northern Alaska to markets via submarine tankers. Also considered is the impact of state and federal legislation, as well as the ability of Alaska natives to generate financial resources from such sources as land, natural resources, funds in federal Alaska Native Fund, and federal loan/grant programs.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number A—7—ASPF.

199472
GREAT LAKES WINTER NAVIGATION — TECHNICAL AND ECONOMIC ANALYSES ANNEX: METHODS OF EVALUATION AND COMPUTER PROGRAM

Department of Naval Architecture and Marine Engineering, University of Michigan, Ann Arbor, Michigan

Final Report, MA—RD—930—75076, Dec 1974, 53pp

This report is an annex to a previously published five volume set of reports dealing with Great Lakes Winter Navigation. Revisions and modifications to the computer program known as the Extended Season Program, or ESP, are summarized. This program is used for the prediction of the economic performance of Great Lakes bulk carriers operating in an extended season. The report describes additions and modifications to the methods of evaluating ship economics and operations during the winter on the Great Lakes and St. Lawrence Seaway. The documentation of the computer program containing these revisions is also updated. Finally, a series of examples illustrates the increased versatility of the computer program.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—75076.

199547
ECONOMIC ANALYSIS OF TRANSPORTATION OF ARCTIC PETROLEUM RESOURCES

Devanney, JW Lassiter, JB

Maritime Administration, Washington, DC 20230

Economic Analysis Report, M—3—TO, March 1973, 85pp

The report examines surface tanker costing, icebreaking tankers, submarine tanker costing, pipeline costing, Arctic petroleum flows and unit resource costs.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number M—3—TO.

199548
A FULL SCALE TEST PROGRAM ON A GREAT LAKES ORE CARRIER DURING WINTER OPERATIONS

Levine, GH Voelker, RP Kotras, TV Kosterich, PP

ARCTEC, Incorporated, 9104 Red Branch Road, Columbia, Maryland 21045

Final Report, ARCTEC—TR—0077—3, Sept 7, 1973, 161pp

The purpose of the study was twofold. First, to conduct full scale tests of an Air Coating System (ASC) aboard the U.S. Steel Corporation bulk carrier LEON FRASER to determine if the ASC would be effective in improving the performance of the ship in mush ice and broken channels. The second purpose was to measure ice forces on the hull structure. To do this, five arrays of strain gages were placed to measure forces caused by straight ahead operation in uniform sheet ice and by turns in restricted channels where the bow and stern would be hitting the edge of the unbroken ice sheet. The required modifications were made to the ship at Fraser Shipyards, Inc., Superior, Wisconsin during November, 1972.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number ARCTEC—TR—0077—3.

199675
ARCTIC TERMINAL FOR ICEBREAKING TANKERS: CONCEPTUAL DESIGN

Lewis, AE

Bechtel Incorporated, Pipeline Division, 5575 Del Monte Drive, Houston, Texas 77056

Final Report, MA—RD—940—79050, March 1979, 13pp

This report presents the conceputal design for a marine terminal located at Wainwright, on the northwest coast of Alaska, to transfer crude oil to 250,000 dwt icebreaking, or ice strengthened tankers on a year around basis. The purpose was to determine the approximate cost of such a terminal as a preliminary guide for use in long range planning by Federal and state agencies, as well as by commercial firms having interests in the area. The site is situated to serve potential oil fields in northwest Alaska, the National Petroleum Reserve in Alaska, or offshore wells under the relatively near shore parts of the Chukchi Sea. The initial throughput capacity is 500,000 barrels per day with phased expansion up to 2,000,000 bpd. The terminal in the first phase consists of a single offshore mooring tower in 120 feet of water about 5 miles offshore connnected by buried pipeline to an onshore facility with 5.2 million barrel storage capacity for oil. The final phase consists of three offshore towers and a total of 10.4 million barrel oil storage capacity. The contractor was assisted by an advisory group of interested oil company and shipping company representatives.

NTIS
Maritime Administration

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199503
IMPROVEMENT IN STEERING CONTROL FOR MERCHANT SHIPS

Highfill, JH Spurgin, WT

Sperry Rand Corporation, Marine Systems Division, Charlottesville, Virginia 22901

Final Report, NMRC—KP—138A, 1976, 102pp

The problem of developing a practical autopilot for all—weather steering in high speed merchant ships is analyzed and broken into 4 smaller problems: Specification of realistic models for the elements involved; Identification of ship model parameters; development of a suitable adaptive control algorithm for the non—linear stochastic system comprising the ship, its steering engines and the seaway disturbance model; and finally a review of the developed algorithms with the objective of eliminating non—essential computations thus improving the computational efficiency.

NTIS
Maritime Administration

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199620
RELIABILITY IMPROVEMENTS FOR VESSEL STEERING SYSTEMS

J.J. Henry Company, Incorporated, Two World Trade Center, New York, New York 10048

Final Report, MA—RD—920—79011, Dec 1978

The report provides a summary of a study sponsored by the Maritime Administration to develop and evaluate recommended improvements to the design, specification, installation, and operation of vessel steering systems for purposes of enhancing steering system reliability, safety, performance, and integrity. Conclusions and recommendations are based on the results of extensive analysis of steering systems failure data obtained from regulatory agencies, classification societies, and vessel owners and operators. Significant results include a quantitative assessment of the relationship between hydraulic system design pressure and system reliability, and the identification of specific rudder, steering gear, and control system design details which should be addressed or further clarified by the appropriate cognizant authorities.

NTIS
Maritime Administration

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046587
REPORT ON RAIL AND MARINE INTERFACE AT THE PORT OF NEW YORK

Maritime Administration, New York, New York

MA—GEN—730—30, March 1973, 43pp

The report examines in detail the elements of cost, time and distance involved in the interface of marine terminal operations with those of the rail carriers for the New York/New Jersey port complex specifically as they related to the American operators. The purpose of the study was to analyze and evaluate the rail carrier/interchange of equipment and to recommend actions which would contribute towards a more efficient and economical intermodal transport system and assist in further enhancing the competitiveness of the American Merchant Marine.

Maritime Administration

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052240
REPORT ON RAIL AND MARINE INTERFACE AT THE PORT OF HAMPTON ROADS

Maritime Administration, Washington, DC 20230

MA—GEN—711—74026, 1973, 29pp

The report examines in some detail the elements of cost, time and distance involved in the interface of marine terminal operations with those of the rail carriers for the Hampton Roads port complex specifically as they relate to the U.S. operators. The purpose of the report was to analyze and evaluate the rail carrier/ocean carrier interchange of equipment and recommend actions to them which would contribute toward a more efficient and economical intermodal transport system and assist in further enhancing the competitiveness of the American Merchant Marine.

NTIS

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093805
TRANSPORTATION ENVIRONMENT DATA BANK INDEX

Davidson, CA Foley, JT

Sandia Laboratories, Albuquerque, New Mexico 87115

June 1975, 37pp

In an effort to determine operating conditions under which shipping containers will be exposed, a "Data Bank" of environmental information has been established by Sandia Laboratories, Division 1542, for the ERDA Division of Waste Management and Transportation. This document is an index which can be used to request data of interest.

NTIS

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095112
ANALYSIS OF LNG MARINE TRANSPORTATION FOR THE MARITIME ADMINISTRATION. VOLUME I

Maritime Administration, Washington, DC 20230

Final Report, Nov 1973, 307pp

This report is an analysis of the transportation of liquefied natural gas by sea. It describes the potential size of the LNG tanker fleet required for projected U.S. LNG imports and the risks associated with U.S. LNG ship construction, operation and LNG importation. Specifically, it includes risks such as the shipbuilder's potential for overrun, the operator's exposure to off—hire and the containment tank subcontractor's chances of building excess capacity. Recommendations are made for measures, other than R and D, that could reduce risks. Finally, an economic and a technical analysis of 19 second—generation LNG ship concepts is described leading to recommendations for MARAD supported R and D.

NTIS

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095168
MARITIME LNG MANUAL

Geremio, JO

National Maritime Research Center, Kings Point, New York 11024

NMRC—KP—126, 1974, 320pp

This study of a current view of the problems and procedures involved in transporting liquefied natural gas by sea begins with a brief historical background and continues with a discussion of the theoretical and practical processes by which natural gas is liquefied. A description is provided of cargo tank construction, typical ship equipment, operating, safety and maintenance procedures. It ends with a discussion of the economics and future growth potential of liquefied natural gas as a natural resource. All of the information presented was obtained from either a variety of publications or from conversations with persons active in the field. The sum total of this information leads to the conclusion that marine transportation of liquefied natural gas is a vital link between the source of an important fuel and its market. (AUTHOR)

Maritime Administration

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139364
GREAT LAKES TRANSPORT OF WESTERN COAL: TECHNICAL AND ECONOMIC ANALYSIS

Elste, VH Scher, RM

Michigan University, Ann Arbor, Michigan 48104

Final Report, MA—RD—940—76061, 7503—7606, June 1976, 149pp

The economics of transporting western coal to consumers in the midwestern and eastern demand regions with a particular emphasis on the Great Lakes waterborne link was investigated. The design characteristics of Great Lakes coal—carrying vessels are discussed in detail. Specific problems involved in the transport of coal in bulk are related to design decisions, particularly in the areas of cargo—handling gear, cubic requirements, ship maneuvering, cargo thawing, and dust control. The relative performance of taconite carriers, specially built colliers, and combination vessels in the coal trade is discussed, together with a consideration of potential problems facing coal carriers diverted to the taconite trade. The economic effects of systematic variations in ship characteristics, including dimensions, materials, proportions, and speed are considered. The impact of fuel price and of operation through the winter is also examined. A comparison of transport alternatives for various pairs of sources and destinations, based on total delivered cost

and energy expenditure, including rail transport and transshipment, is made. Conclusions are offered regarding the future of Great Lakes operations in view of the emerging coal traffic.

Maritime Administration

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151326
MATERIALS HANDLING EQUIPMENT. VOLUME II. APPENDIXES

Litton Systems, Incorporated, Pascagoula, Mississippi

Final Report, MA—RD—920—77034, Jan 1974, 143pp

The objective of this study was to investigate material handling techniques and equipment currently used in U.S. shipyards and to determine methods of expediting and lowering the cost of the material handling function. Volume 2 contains a series of appendixes containing back—up technical data for the report.

NTIS

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151327
MATERIALS HANDLING EQUIPMENT STUDY. VOLUME I. SUMMARY TECHNICAL REPORT

Litton Systems, Incorporated, Pascagoula, Mississippi

Final Report, MA—RD—920—77033, Jan 1974, 36pp

The objective of this study was to investigate material handling techniques and equipment currently used in U.S. shipyards and to determine methods of expediting and lowering the cost of the material handling function. Volume 1 is the summary technical report documenting the results of the overall effort.

NTIS

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172375
AUTOMATED SEQUENCING OF CONTAINERS FOR CONTAINERSHIP LOADING AND UNLOADING: SUMMARY REPORT

Cojeen, HP Van Dyke, P

HYDRONAUTICS, Incorporated, Pindell School Road, Laurel, Maryland 20810

Summary Report, No. 7564—3, Feb 1977, 49pp

This report describes a system of computer programs which has been designed to aid cargo loading supervisors and terminal personnel in performing prestow planning and subsequent generation of sequential loading and unloading instruction for a full containership, or using similar technology, for LASH vessels.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price.

172376
MARINE TERMINAL CONTROL SYSTEM: FINAL REPORT

Collins, D

Computer Identics Corporation, Westwood, Massachusetts 02090

Final Report, July 1976, 102pp

This report describes the design and development of a prototype computer—based marine terminal control system with automatic container identification. It documents the mini—computer system configuration with input/output devices positioned at key control points within the terminal and covers the operational performance of this system at the Howland Hook, Staten Island, New York container terminal.

Maritime Administration

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175095
FEASIBILITY OF UNITED STATES FLAG HEAVY LIFT SHIPPING. VOLUME II. REPORT

Andrews, BV

Lykes Brothers Steamship Company, Incorporated, 300 Poydras Street, New Orleans, Louisiana 70130

MA—RD—940—77064, Jan 1977, 252pp

Heavy lift is defined as ship cargo units exceeding 100 tons or 80 feet length, or 15 feet width. This study identifies and describes the heavy lift units and market demands for heavy lift services, and estimated the 1978 international traffic available to U.S. flag vessels after including small ships for lift, roll, and float cargo handling, general cargo liners converted with midbodies and derricks, and tugs with barges for roll handling, were prepared, and building and voyage costs estimated. The numbers and charges of foreign ship competitors, and the availability and capacity of railcars and barges were assessed. Methods were developed for estimating heavy lift transport charges by highway, railway, barge and ocean carrier; and for cargo handling, both in America and abroad. Voyages of ten vessels were simulated carrying typical shipments, to evaluate performance of each system.

NTIS

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175096
FEASIBILITY OF UNITED STATES FLAG HEAVY LIFT SHIPPING. VOLUME III. APPENDICES

Andrews, BV

Lykes Brothers Steamship Company, Incorporated, 300 Poydras Street, New Orleans, Louisiana 70130

MA—RD—940—77065, Jan 1977, 146pp

These appendices examine specific aspects of the shipment of heavy lift units, defined as exceeding 100 tons, or 80' length, or 15' width. Heavy lift units, traffic, and data sources were described, as were industrial projects generating heavy lift movements. Cargo preference activities of many countries were listed. The regulations of the ICC affecting vessel operators were examined and the availability from MarAd of government aids for U.S. vessels. Seven alternative types of heavy lift ships were described, and the manning of all small ships. Port cranes throughout the world were inventoried. Voyage itineraries and port calls of 17 existing heavy lift ships were analyzed.

NTIS

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175152
A PRELIMINARY FEASIBILITY STUDY OF STEAM COAL SLURRY MARINE TRANSPORT SYSTEMS

Roseman, DP Tomassoni, CA

American Bulk Cement Systems, Incorporated, New York, New York

7692—1 150pp

The anticipated increase in the export of steam coal from the United States provides an opportunity for establishing advanced handling and transport systems to serve the new markets. This study investigated the feasibility of using a coal—water slurry system to move the commodities in question. A specific export opportunity, from the U.S. to a new Mediterranean power plant, was investigated in detail. The study found that the use of slurry technology was technically feasible and offered the advantage of rapid loading and discharge rates, the ability to operate at offshore terminals and the elimination of air pollution during loading and unloading operations. The major disadvantages were found to be the requirements for large quantities of fresh water and the inherent problems of dewatering for both the ship loading and the power plant receiving portions of the system. The use of converted ships for the slurry trade were also studied. Converting a 225,000 DWT VLCC and an 80,000 DWT OBO were both found to be feasible, and the freight rates were found to be competitive.

NTIS

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199320
MARKET ENVIRONMENT AND CONTAINER SYSTEM PRODUCTIVITY

McCaul, JR

National Maritime Research Center, Kings Point, New York 11024

Final Report, NMRC—KP—109, 1974, 146pp

The study examines the extent to which containerization has spread, both geographically and in terms of commodities moving in containers. Penetration by U.S. carriers in the container market is explored and load factors on major trade routes are estimated. The relationship between load factor and unit cost is investigated and conclusions derived as to the competitive abilities of U.S. container carriers. Among the conclusions reached in the study are: containerized service in international trade has grown about 140% from 1969 through 1972, with varying growth patterns in different areas and varying penetration in different commodities; containerization has a relatively lower penetration in Southern and Gulf Coast States reflecting a potential market opportunity.

NTIS
Maritime Administration

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199391
REFRIGERATED CONTAINER RESOURCES SHARING: PHASE I: DESIGN

MANALYTICS, Incorporated, 625 Third Street, San Francisco, California 94107

Final Report, M—3—RC, March 1975, 20pp

This report covers only the design phase to establish the economics of a container resource sharing arrangement among American ocean carriers. Examined were alternative methods for demonstrating the results of refrigerated container sharing by several, if not all, U.S. flag liner operators carrying refrigerated containers. A detailed plan was developed for the evaluation phase.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number M—3—RC.

199486
CONFERENCE ON REFRIGERATED CONTAINERS

Maritime Administration, Washington, DC 20230

Conference Objectives, M—3—CR, Feb 1, 1973, 70pp

The conference focused on the feasibility of using refrigerated containers, particularly reefer containers, in penetrating new markets.

Maritime Administration

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199504
THE NATIONAL MARITIME BULK COMMODITIES SIMULATION MODEL: VOLUME III

Ernst & Ernst, Washington, DC 20036

Users Documentation, MA—GEN—970—76064, May 1976, 97pp

This is the third of a three volume set documenting the Maritime Administration's Bulk Commodities Simulation Model. These documents supersede those issued in April, 1975, which described a prototype version of the model, addressing U.S. Gulf ports only. Volume I, entitled Management Summary, contains an overview of the application and use of the computerized version of the Model. The purpose of this volume (Volume III) is to describe and document in detail the necessary procedures associated with such an application. The technical details of the model design and development are provided separately in Volume II, entitled Technical Report.

NTIS
Maritime Administration

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199505
THE NATIONAL MARITIME BULK COMMODITIES SIMULATION MODEL: VOLUME II

Ernst & Ernst, Washington, DC 20036

Final Report, MA—GEN—970—76062—Vol.II, May 1976, 137pp

This is the second of a three volume set documenting the Maritime Administration's Bulk Commodities Simulation Model. These documents supersede those issued in April, 1975, which described a prototype version of the model, addressing U.S. Gulf ports only. Volume I, entitled

Management Summary, contains an overview of the technical aspects of the Model design and development. The purpose of this volume (Volume II) is to describe and document these technical aspects in detail. The details for actually applying the computerized version of the Model are provided separately in Volume III, entitled Users Documentation.

NTIS
Maritime Administration

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199506
THE NATIONAL MARITIME BULK COMMODITIES SIMULATION MODEL: VOLUME I

Ernst & Ernst, Washington, DC 20036

Management Summary, MA—GEN—970—76062—Vol.I, May 1976, 32pp

The efficiency with which maritime transportation systems can be operated is dependent on numerous variables, vessel design, terminal location, regulatory restrictions, collisions, cargo spills, etc. The effects of changes in these variables can be significant and are manifested primarily in resulting port and inland transport congestion phenomena and on the economy of the shipping industry and the national economy as a whole. This model has been expanded to include all grain exporting ports in the United States and supersedes the prototype model addressing U.S. Gulf ports only, issued in April, 1975. This volume provides an overview of the origins of the model, its technical development, and design aspects, and its potential uses and benefits. Volume II provides the technical report and Volume III, the users documentation.

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199517
THE MARITIME BULK COMMODITIES SIMULATION MODEL: VOLUME III

Ernst & Ernst, Washington, DC 20036

Users Documentation, MA—GEN—970—76011, March 1975, 92pp

This is the third of a three volume set documenting The Maritime Bulk Commodities Simulation Model. The purpose of the volume is to describe and document in detail the necessary procedures associated with the application and use of the model.

NTIS
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199518
THE MARITIME BULK COMMODITIES SIMULATION MODEL: VOLUME II

Ernst & Ernst, Washington, DC 20036

Final Report, MA—GEN—970—76010, March 1975, 86pp

This is the second of a three volume set documenting The Maritime Bulk Commodities Simulation Model. The purpose of this volume is to describe and document the technical aspects in detail of model design and development.

NTIS
Maritime Administration

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199526
THE APPLICATION OF SLURRY TECHNOLOGY TO THE MARITIME INDUSTRY

Marconaflo, Incorporated, San Francisco, California 94111

Phase I, Final Report, MARCO—3—A, May 31, 1976, 108pp

The objective of this program was to investigate the feasibility of applying slurry principles to marine transport in general with emphasis on a few selected commodities as an approach to improving or enhancing the position of United States flag shipping companies. This report covers the state—of—the—art of slurry marine transport, encompassing loading and discharge facilities as well as ship characteristics. A brief qualitative economic analysis of various shipping methods is included to identify trends.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MARCO—3—A.

199555
A STUDY OF EXPORT SHIPMENTS OF SELECTED AGRICULTURAL PERISHABLES

TRC Development, Incorporated, La Jolla, California

Final Report, MA—RD—900—74046, March 1974

The purpose of the study is to consider the problem of time delay in the movement of certain perishable commodities for export, and the effect of delays in this movement on the export process, specifically from the viewpoint of the American Merchant Marine.

NTIS
Maritime Administration

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199601
OPERATIONAL EVALUATION OF A COMPUTER LOADING PROGRAM FOR CONTAINER VESSELS

Thoolen, S Meade, G Scott, D

Matson Terminals, Incorporated, 100 Mission Street, San Francisco, California 94111

Final Report, May 1978, 86pp

This report covers an evaluation of a computer program developed by Hydronautics, Inc., under DOC Contract 5—38023 that provides for the automated sequencing of containers for containership loading and unloading. It includes a brief overview of the shiploading problem, a

synopsis of the program's operation, and an analysis and evaluation of the program in an operational environment. Based on the analysis and evaluation, program requirements were developed and reviewed in detail.

NTIS
Maritime Administration

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199632
IMPEDIMENTS TO OVERSEAS SHIPPING OF LESS THAN CONTAINERLOAD CARGOES

Marshall, RB

Webb Institute of Naval Architecture, Glen Cove, New York 11542

NMRC—KP—194, Nov 1978, 74pp

This report surveys the process of intermodal transportation of less—than—container load (LCL) cargoes in overseas trade, with particular attention to export shipments moving from inland ports. It describes the many entities involved, in one way or another, in cargo movements by land and water combined. Various impediments to efficient LCL movements are discussed under institutional and operational categories. These impediments are rated in order of importance for research. Conclusions and recommendations are given for steps that industry and government could take, the highlights being; 1) information gathering on magnitude of LCL shipments, 2) encouragement of shipper organizations, 3) support of legislation to facilitate intermodal transportation, 4) study feasibility of inland consolidation centers.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—KP—194.

199663
ALTERNATIVE LIQUEFIED GAS CARGOES

Massachusetts Institute of Technology, Cambridge, Massachusetts

Final Report, Oct 1978

This study analyzes the feasibility of providing single—cargo liquefied gas carriers with the capability to transport alternative liquefied gas cargoes. It addresses 1) the characteristics of existing and probable future liquefied gas terminals, 2) the technology of liquefied gas carriers and associated equipment, 3) the impact on vessel design of incorporating alternative cargo capability, and 4) the impact of federal agencies on the decision—making process.

NTIS
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199676
IMPROVING PRODUCTIVITY FOR BULK COMMODITY TRANSFER FACILITIES IN THE GREAT LAKES TRADE AREA

Ernst & Ernst, Washington, DC 20036

Executive Summary, MA—RD—970—79043ES, April 1979

Recommendations of the report are to: 1) consolidate and/or improve selected coal loading facilities, 2) encourage the development of bulk commodity storage facilities at selected lake ports, 3) increase equipment utilization at unloading facilities, 4) develop capability to unload continuously, 5) improve interface between shoreside facilities and self—unloading vessels, 6) develop contingency plans for facility operations in the event of a substantially extended navigation season, 7) conduct feasibility study of automated system—wide vessel scheduling, and 8) develop methodology for conducting productivity analysis of individual facilities.

NTIS
Maritime Administration

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199677
IMPROVING PRODUCTIVITY FOR BULK COMMODITY TRANSFER FACILITIES IN THE GREAT LAKES TRADE AREA

Ernst & Ernst, Washington, DC 20036

Final Report, MA—RD—970—79043, April 1979

Recommendations of the report are to: 1) consolidate and/or improve selected coal loading facilities, 2) encourage the development of bulk commodity storage facilities at selected lake ports, 3) increase equipment utilization at unloading facilities, 4) develop capability to unload continuously, 5) improve interface between shoreside facilities and self—unloading vessels, 6) develop contingency plans for facility operations in the event of a substantially extended navigation season, 7) conduct feasibility study of automated system—wide vessel scheduling, and 8) develop methodology for conducting productivity analysis of individual facilities.

NTIS
Maritime Administration

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127578
PREFAILURE EVALUATION TECHNIQUES FOR MARINE COATINGS

Rudlowski, G

General Dynamics Corporation, Quincy, Massachusetts

MA—RD—930—75072, Feb 1975, 257pp

The success of a coating system is dependent on many things from surface condition to weather at the time of application. The only assurance of the quality of a coating system comes from monitoring and controlling the surface preparation, paint quality and application. A few application tests can be made to obtain limited assurance that the coating system will perform satisfactorily. This report provides the shipyards with the minimum practical tests and controls which should be implemented to insure a successful coating system.

NTIS

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151324
DEVELOPMENT OF NON—POLLUTING, SOLVENT—FREE, LIQUID RESIN COATING SYSTEMS FOR SHIPS

Thorell, LM Mirick, W Nowacki, LJ

General Dynamics Corporation, Quincy, Massachusetts

Final Report, MA—RD—020—77031, 1974, 39pp

The objective of the research was to develop liquid solvent—free coating system and practical methods for their application in shipyards. The report describes the results of this research which demonstrates the feasibility of solvent—free liquid resin coatings under laboratory conditions.

NTIS

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151330
IMPROVED FABRICATION PRIMER FOR PROTECTION OF STEEL

Rudlowski, G Moffatt, W

General Dynamics Corporation, Quincy, Massachusetts

MA—RD—930—77030, Oct 1975, 285pp

Twenty—five of the leading pre—fabrication primers utilized by shipyards were evaluated for the following: ease of application, suitability w/auto spray equipment, protection, effects of various climates, compatibility with top coats, weldability, and ease of repair. The report contains the results of these evaluations.

NTIS

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166713
AN INVESTIGATION OF METHODS TO REDUCE OR ELIMINATE CAVITATION EROSION OF SHIP PROPELLERS

Conn, PK Hackworth, JV Snell, IC

Bell Aerospace Company, P.O. Box 1, Buffalo, New York 14240

Final Report, MA—RD—920—77085, June 1977, 104pp

Erosive impact intensity of cavitation generated by a model propeller in water tunnel flows is related to specific off—design conditions that a propeller experiences in a ship's wake. Uniform velocity flows were used so that effects of off—design conditions could be separated from effects of cavitation dynamics introduced by periodic rotation through the wake. Erosive impact intensity was measured by the size and rate of formation of pits formed on the polished blades by impact of loads created by collapse of cavitation bubbles. Information is also presented on the evaluation as erosion resistant coverings for propellers, of five polyurethane formulations developed by Bell Aerospace Textron and thirteen commercial materials applied by seven suppliers. This laboratory evaluation included cavitation erosion resistance of the coverings and lap shear strengths of their bonds to ABS Type 4 bronze before and after 6 months immersion in salt water.

NTIS

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199469
PARAMETERS FOR A SHIP HULL CLEANING SYSTEM USING THE CAVIJET (TM) CAVITATING WATER JET METHOD

Conn, AF Rudy, SL

HYDRONAUTICS, Incorporated, Pindell School Road, Laurel, Maryland 20810

Final Report, NMRC—275—42210—R1, July 1975, 122pp

This report describes the first part of a program to determine the parameters required for systems which utilize the CAVIJET (cavitating waterjet) method to remove fouling paint and rust from ship hulls, propellers, appendages and other components. System, operating, and performance characteristics, with emphasis on a hand—held system comparable to those now being used during the dry dock cleaning of a ship, were developed under this program. Laboratory fouling removal rates of 900 to 1030 sq.ft./hr. were achieved on submerged test panels heavily encrusted with barnacles and other marine growths, using 1/4 inch or dual 1/8 inch cavitating water jet nozzles, at pressures of 1500 to 2000 psi. These rates are comparable to sandsweeping methods, with none of the attendant pollution problems. Severely rusted and pitted steel panels were cleaned to a white metal finish, using cavitating water jets at 6000 psi, with no abrasive additives. These laboratory rust cleaning rates (60 sq.ft./hr. for a single 1/8 inch nozzle; over 120 sq.ft./hr. for a dual nozzle system) are equivalent to those for sandblasting of ship components. The lack of pollution associated with the CAVIJET method, and the potential of much lower operating costs for the same rates of cleaning, make this new technique an attractive alternative to the current cleaning methods.

NTIS
Maritime Administration

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199672
HULL CLEANING SYSTEMS USING CAVIJET CAVITATING FLUID JETS: A FEASIBILITY STUDY

HYDRONAUTICS, Incorporated, Pindell School Road, Laurel, Maryland 20810

Final Report, Jan 1979, 136pp

This study evaluates the suitability of the CAVIJET cavitating water jet method in cleaning actual ship hulls. It follows an earlier first phase effort which successfully demonstrated the CAVIJET in the laboratory. Equipment for testing full—scale removal of fouling was developed and used in field trials on actual ship hulls in drydock. This same six—nozzle CAVIJET cleaning system was also used for underwater trials, and proved practical.

NTIS
Maritime Administration

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199406
RELIABILITY AND MAINTAINABILITY PRACTICES AND PROCEDURES UTILIZED BY SELECTED EUROPEAN CERTIFICATION SOCIETIES FOR SHIPBOARD ELECTRONIC EQUIPMENT

McCarthy, T

National Maritime Research Center, Kings Point, New York 11024

Summary Report, NMRC–KP–171–2, Apr 1977, 182pp

This report documents a survey of marine equipment certification and approval procedures of selected European certification societies. Of particular interest are the extent to which these societies apply reliability engineering practices; collect failure/repair data; and conduct the equipment approval process. Certain certification–related practices considered potentially beneficial to the U.S. Maritime Administration were noted, and constitute the basis for recommendations offered in this report. Extracts of foreign (European) certification society R&M requirements are presented in the Appendixes.

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084463
JOINT MARITIME ADMINISTRATION/U.S. COAST GUARD TANK BARGE STUDY.

United States Coast Guard, Washington, DC 20590

Dec 1974, 107pp

On December 24, 1971, the U.S. Coast Guard published proposed rule making in the Federal Register which would, in part, require double—walls and double—ends for tank barges of 100 gross tons or more built, rebuilt, or converted to oil service after December 31, 1972. This requirement would not apply to tank barges that have a certificate of inspection for ocean or coastwise service under 46 CFR Chapter I when operated as the only barge in a tow. Subsequent public comment on the proposed rule making suggested that a double—wall and double—end regulation might impose a heavy economic burden on the towing industry without a prior and full investigation of the costs and benefits involved. The Maritime Administration and the Coast Guard accordingly initiated a joint study effort to assess the relative construction and life cycle costs of various inland tank barge designs, both existing and hypothesized, and to examine product spill and hull damage performance of existing tank barges. This publication is the final report of the joint study effort.

Maritime Administration

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084861
ADVANCED OCEAN TUG—BARGE SYSTEMS: A PROGRAM FOR EVALUATING OCEAN GOING, CONNECTED TUG BARGE FLOTILLAS BY LARGE SCALE, OPEN WATER MODEL TESTING

Filson, JJ

National Maritime Research Center, Galveston, Texas 77550

NMRC—272—21000—R1, May 1972, 198pp

A testing program for evaluating ocean tug—barge systems using relatively large (1/20 to 1/10 scale) prototypes is presented. Proposed models are detailed for three varying degrees of freedom tug—barge linkage systems. Approaches for analytically modeling both the tug—barge systems and the sea states are explained. Equipment, facility and personnel requirements are detailed. An overview of the necessary instrumentation recommends the data to be recorded and the sensors to be used. Instructions for testing include discussions of environmental considerations as well as operating procedures. Rough estimates of time schedules and costs are also included.

NTIS

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149328
EXPERIMENTAL RESEARCH RELATIVE TO IMPROVING THE HYDRODYNAMIC PERFORMANCE OF OCEAN GOING TUG/BARGE SYSTEMS PART A, RESISTANCE AND PROPULSION EXPERIMENTS

Day, WG, Jr

David Taylor Naval Ship R&D Center, Bethesda, Maryland 20034

Final Report, MA—RD—940—77050, Feb 1974, 43pp

This report presents the results of resistance and propulsion experiments conducted with three tug/barge concepts. Concept I consists of a tug and barge coupled together to form a rigid body and Concept II permits only relative pitch freedom. Concept III is similar to Concept II in that the same barge and pin location was used and relative pitch freedom. The resistance experiments showed little difference between the Series 60 parent hull and the Case I tug/barge system. For Case 2, the effective horsepower was 15% greater than for Case 1. For the Case 3 configuration, the effective horsepower was 21% greater than for case 1 at design speed and draft. The propulsion experiments also reflect the increases in resistance.

Maritime Administration

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149329
EXPERIMENTAL RESEARCH RELATIVE TO IMPROVING THE HYDRODYNAMIC PERFORMANCE OF OCEAN GOING TUG/BARGE SYSTEMS: PART B, SEAWORTHINESS EXPERIMENTS (CONCEPTS I AND II)

Rossignol, GA

David Taylor Naval Ship R&D Center, Bethesda, Maryland 20034

Final Report, MA—RD—940—77051, Aug 1974, 68pp

This report presents the results of seaworthiness experiments conducted with two tug/barge concepts. Concept I consists of a tug and barge coupled together to form a rigid body and Concept II permits only relative pitch freedom. Theoretical predictions of Concept II responses are also presented. Some of the more important results of the investigation are: (a) The longitudinal acceleration of the tug pilot house and longitudinal pin force increased considerably, while the vertical pin force showed considerable decrease for Concept II. (b) The relative pitch freedom of Concept II permitted more effective propeller and rudder operation. (c) There is good agreement between linear theory predictions and experimental data for Concept II.

Maritime Administration

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149330
EXPERIMENTAL RESEARCH RELATIVE TO IMPROVING THE HYDRODYNAMIC PERFORMANCE OF OCEAN GOING TUG/BARGE SYSTEMS: PART B, SEAWORTHINESS EXPERIMENTS (CONCEPT III)

Rossignol, GA Woo, EL

David Taylor Naval Ship R&D Center, Bethesda, Maryland 20034

Final Report, MA—RD—940—77052, April 1975, 43pp

This report presents the results of seaworthiness experiments and undocking maneuvers conducted with the concept III tug/barge design. This concept is quite similar to the concept II design in that the same barge and pin location was used and relative pitch freedom was permitted. Some of the more important results of the investigation are: (a) The Concept III forces and moments are larger than those for Concept II, with the vertical and transverse forces showing the largest increase. (b) The Concept III relative pitch, tug pitch and tug/barge roll motions are larger than those of Concept II. (c) Optimum undocking of the tug was accomplished only when the pins were retracted at a point of minimum motion and force, followed by prompt backing of the tug before considerable motion could develop.

Maritime Administration

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149331
EXPERIMENTAL RESEARCH RELATIVE TO IMPROVING THE HYDRODYNAMIC PERFORMANCE OF OCEAN GOING TUG/BARGE SYSTEMS: SUMMARY REPORT

Robinson, JG

David Taylor Naval Ship R&D Center, Bethesda, Maryland 20034

Final Report, MA–RD–940–77053, May 1976, 94pp

Three ocean–going tug/barge systems for push towing have been experimentally evaluated for resistance, propulsion, and seakeeping (loads and motions). One employs a completely faired in rigidly connected tug/barge interface; the other two (one single–screw and one twin–screw) employ a pinned joint connection which allows relative pitching between tug and barge. The systems are designed to carry approximately 47,000 tons of cargo using a 3300 BHP medium speed diesel power plant. Propulsion results show the rigidly connected case to have a sea speed of 19 knots while the pinned cases suffer a 1 to 1 1/2 knot loss at the same power. Seakeeping results show all three systems capable of transoceanic service. The rigid connection case is equivalent to a conventional ship and develops its highest connection forces in the vertical direction. The pinned cases relieve vertical forces but accentuate longitudinal forces (to prevent relative yaw). A new computer program has been developed to handle the pinned case vertical force and motion response; its accuracy of prediction has proved to be good. Decoupling of the pinned case is feasible in a moderate seaway, but is not recommended as a design requirement for all conditions. Useful design guidance is provided for the three cases considered, with full discussion of the critical factors and explanation for certain behavior patterns. Extrapolation to other sizes is discussed. Performance differences are such that analytical techniques are inadequate for quantitative assessments, and testing of specific geometries is necessary. Recommendations include further analysis of existing data as well as additional tests of existing models.

Maritime Administration

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175171
A SUPPLY–DEMAND ANALYSIS OF THE MOBILE OIL DRILLING RIG MARKET, 1977 – 1987. VOLUME I.

Durfee, JH

BDM Corporation, 7915 Jones Branch Drive, McLean, Virginia 22101

MA–RD–940–78008, 355pp

This report contains a comprehensive short–to–medium range analysis of the supply and demand factors impacting on the markets for offshore oil drilling rigs and related support vessels. Descriptions of the mobile drilling rig and support vessel markets were prepared in which relevant factors and variables which interact to form the 'market' were identified and evaluated. To provide the data base for such an analysis, oil and gas reserves worldwide together with the development policies of major oil producing nations were identified and discussed. The report includes an analysis of the financial performance of the offshore oil drilling industry and the segment of the industry that operates vessels in support of drilling activities. The report also includes a detailed analysis of the financial performance of some of the major offshore drilling contracting firms and a forecast of mobile drilling rig and support vessel supply and demand for the years 1977, 1982 and 1987.

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175172
A SUPPLY–DEMAND ANALYSIS. VOLUME II. OF THE OFFSHORE OIL INDUSTRY SUPPORT CRAFT MARKET

Durfee, JH

BDM Corporation, 7915 Jones Branch Drive, McLean, Virginia 22101

MA–RD–940–78009, 104pp

Volume Two of this report presents a description of the market for offshore petroleum industry support craft and an analysis of that market. Financial performance of five major operating companies is described. A forecast of support craft supply and demand for 1977, 1982, and 1987 is included.

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175173
A SUPPLY–DEMAND ANALYSIS OF THE MOBILE OIL DRILLING RIG AND SUPPORT CRAFT MARKETS. EXECUTIVE SUMMARY.

Durfee, JH

BDM Corporation, 7915 Jones Branch Drive, McLean, Virginia 22101

MA–RD–940–78007, 47pp

The purpose of this study was to assist the Maritime Administration in determining the economic soundness of vessel construction projects submitted pursuant to the Federal Ship Financing Guarantee program. In addition, there is a detailed discussion of worldwide offshore oil and gas reserves and undiscovered recoverable resources, recent production trends, and exploration/development policies of principal current and potential oil producing countries based on the location of offshore resources. The rig market includes the three major types of mobile drilling units: jackups, semisubmersibles and drillships. The support craft market is grouped into nine types of support vessels commonly employed by the industry. The mobile rig forecast is presented on a regional basis indicating the future demand for offshore drilling units in relation to the characteristics of the region and the anticipated development within the region.

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199300
MULTIPURPOSE HARBOR SERVICE CRAFT REQUIREMENTS STUDY: VOLUME II

Guss (Leonard) Associates, Incorporated, Tacoma, Washington

Research Report, MA–RD–900–74044, Feb 1974, 144pp

The objectives of the study were to assess the need for, and interest in, a multi–purpose harbor services vessel which would, on a cost/effective basis, provide: fire fighting, security and law enforcement, rescue and boating safety, and pollution control services. The study was to determine the performance specifications for such a vessel, and to evaluate alternative designs and existing and proposed vessels. Three detailed subject reports were issued: on the literature search, the Tacoma Harbor Survey, and the National Ports Survey. This report includes key information from each of these subject reports, together with the establishment of required performance specifications and the equipment evaluation.

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199325
MULTIPURPOSE HARBOR SERVICE CRAFT REQUIREMENTS STUDY: VOLUME I: SUMMARY AND RECOMMENDATIONS

Guss (Leonard) Associates, Incorporated, Tacoma, Washington

MA—RD—900—74045, Feb 1974, 65pp

The purpose of the study was to develop performance requirements for a multipurpose harbor service craft, comprising fire fighting, law enforcement and security, and rescue and first aid capabilities. A detailed analysis of Tacoma's needs for such a vehicle was performed, together with a survey of 16 other port cities. An assessment of this vehicle is presented, as well as its critical performance parameters.

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199373
HEAVY LIFT LASH BARGE PROJECT: LIFTING POST DESIGN CRITERIA

Breit & Garcia, Naval Architects, New Orleans, Louisiana

Final Report, BAG—D—1299—5, Jan 1977, 12pp

This volume supplements the "Report of Heavy Lift Lash Barge Design and Market Survey Results" by listing the technical design criteria selected as the basis in developing the lifting post structure. The criteria permit more accurate assessment of predictions of the instantaneous dynamic loads resulting from the combination of the barge/ship motion, sea state, wind, flooding damages, and crane handling. The criteria in aggregate thus affect estimates of severe loads for the lifting posts. The volume's appendix contains a summary of the damage stability investigation and the critical lifting post loading.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAG—D—1299—5.

199383
REPORT OF HEAVY LIFT LASH BARGE DESIGN AND MARKET SURVEY RESULTS FOR WATERMAN STEAMSHIP CORPORATION

Breit & Garcia, Naval Architects, New Orleans, Louisiana

Final Report, BAG—D—1299—4, Nov 1976, 39pp

Based on extensive use of the existing fleet of LASH vessels with heavy barge capacity cranes, it is envisaged that a cost saving method to ship heavy and bulky cargoes is to employ the LASHship with the cargoes held on a new version of LASH pontoon, the heavy lift LASH barge. In this way, the cargoes secured on the pontoon may be shipped directly from the manufacturer's quay to the end user's quay or to a beach in an undeveloped area. Subsequent to a feasibility study, this report addressed: parametric studies on deadweight, cargo height, and stability conditions.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAG—D—1299—4.

199396
HEAVY LIFT LASH BARGE PROJECT: ANALYSIS OF LIFTING POST DESIGN OPTIONS

Breit & Garcia, Naval Architects, New Orleans, Louisiana

Analytical Report, BAG—D—1299—2, Aug 1976, 32pp

This report details and evaluates various design options for lifting posts on a Heavy Lift LASH Barge, and recommends utilizing independent posts with two sets of lifting cones. Designs evaluated include: a) lift—off designs (with or without adaptor sockets) which can be considered simple reliable approaches, maintenance free, and which eliminate machining work required by other methods, b) the hinged slip—on design and hinged L—leg design, which are ways to effect change of the lifting post height but which require reasonably good construction tolerance controls to avoid the swaying actions due to slack connections of the mating parts, and c) telescopic lifting posts, which demand the highest investment in construction and continued maintenance.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAG—D—1299—2.

199400
HEAVY LIFT LASH BARGE PROJECT: REPLIES TO MARITIME ADMINISTRATION

Breit & Garcia, Naval Architects, New Orleans, Louisiana

Final Report, BAG—D—1299—6, Jan 12, 1977, 20pp

This volume answers specific questions concerning such matters as companies surveyed in the marketing study, design load factors, operational demands, and height limits.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAG—D—1299—6.

199401
SPECIFICATIONS FOR A HEAVY LIFT LASH BARGE FOR WATERMAN STEAMSHIP CORPORATION

Breit & Garcia, Naval Architects, New Orleans, Louisiana

Specification Report, BAG—D—1299—3, Nov 1976, 52pp

This document contains the specifications for constructing a Heavy Lift LASH Barge, including: general provisions, hull structure, equipment and outfitting, cleaning and painting, and label plates and markings.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAG—D—1299—3.

199402
HEAVY LIFT LASH BARGE PROJECT: PRELIMINARY REPORT OF INVESTIGATION

Breit & Garcia, Naval Architects, New Orleans, Louisiana

Investigation Report, BAG—D—1299—1, May 1976, 38pp

Shippers are in search of suitable vehicles to provide their clients reliable, rapid, and economical services in handling odd size, bulky cargoes, including cargoes in standard containers. No heavy lift equipment exists in many ports to which heavy cargoes might possibly be economically shipped; therefore an alternate means of removing cargoes from a ship must be developed in order to establish this new trade. The concept of using LASH barges to transport heavy cargoes is realistic and has been explored herein. The LASH ships with their heavy lift shipboard gantry cranes have the advantage due to their capability to receive and to release the preloaded LASH barges. The existing form of LASH lighters, however, creates problems at the discharge site where the cargoes must be removed by some means other than cranes or lifting devices.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAG—D—1299—1.

199427
COMPUTER PROGRAM FOR THE ANALYTICAL ASSESSMENT OF FLEXIBLY CONNECTED BARGE TRAINS: VOLUME II

Brown, DL Marriner, JE McFarland, DB

Barge Train, Incorporated, Long Beach, California

Final Report, MA—RD—940—77089, July 1977, 183pp

The program described in this report was developed to define the dynamic response of a flexibly connected barge train proceeding with a constant velocity. Hydrodynamic strip theory and a pulsating source potential technique is utilized to define the hydrodynamic properties of the system. Methods of elasto—mechanics are utilized to define the flexibility of the connector system. The theoretical development and complete user oriented information is presented. Examples of input data, program execution and output data are also presented. Appendices are included in Volume II which present the program listings, sample problem results and program verification.

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199430
COMPUTER PROGRAM FOR THE ANALYTICAL ASSESSMENT OF FLEXIBLY CONNECTED BARGE TRAINS: VOLUME I

Brown, DL Marriner, JE McFarland, DB

Barge Train, Incorporated, Long Beach, California

Users Manual, MA—RD—940—77088, July 1977, 133pp

The program described in this report was developed to define the dynamic response of a flexibly connected barge train proceeding with a constant velocity. Hydrodynamic strip theory and a pulsating source potential technique is utilized to define the hydrodynamic properties of the system. Methods of elasto—mechanics are utilized to define the flexibility of the connector system. The theoretical development and complete user oriented information is presented. Examples of input data, program execution and output data are also presented.

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199519
ECONOMIC FEASIBILITY REPORT ON SEMI—RIGID BARGE LINKAGES FOR BARGE TRAINS

Hautanen, RW

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—273—31200—R4, Apr 1975

This report presents the results of an economic feasibility study of close—coupled semi—rigid tug/barge linkage systems for multiple—barge towing. The report shows that semi—rigid systems are economically feasible, most particularly when they eliminate cargo transfers and port restrictions. All effort to date indicates that such systems can operate in coastal seas and in the open ocean, though the particular system given the most study is not yet commercially operational. Large savings are probable in both capital expenditures and time of construction in comparison with conventional ships.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—273—31200—R4.

199546
LIFE CYCLE COSTS OF SELECTED RIVER TANK BARGE CONFIGURATIONS

Breit Engineering, Incorporated, New Orleans, Louisiana 70130

Final Report, B—7—L, Sept 1973, 94pp

Life cycle costs of representative single skin, double wall and double hull tank barges of the existing 1973 river fleet are estimated. Costs of modifications to convert single skin barges to alternative configurations, including double wall, double hull, and various methods of strengthening, are also estimated. Tables and graphs present the life cycle costs at 5, 10 and 15 percent discount rates.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number B—7—L.

199551
EXPERIMENTAL EVALUATION OF THE SEAWORTHINESS CHARACTERISTICS OF THE BARGE TRAIN

Rossignol, GA Ruth, LC Woo, EL

David Taylor Naval Ship R&D Center, Bethesda, Maryland 20034

Ship Performance Report, SPD—P—645—01, Nov 1975, 61pp

This report presents the results of seaworthiness experiments conducted with a system of models of four semirigidly linker river barges which is referred to as the Barge Train. The linkage connectors permit relative pitch freedom and some relative heave displacement; but considerable restraint is provided for all other relative motions. Some of the more important results of the investigation are: a) Barge linkage connector configuration 3 resulted in considerably larger movements and forces than did connector configuration 1 or 2; while the heave accelerations of

the barges are smallest for connector configuration 1; b) the most severe moments and forces measured during the entire experiment were at the 120 degree heading. For /La=1.75 and at wave steepness of 1/50, barges B and C began to collide with each other and the connectors between them were severely bent; c) the Barge Train motions are greatest at the 120 degree heading; d) for most of the conditions, the forces and moments at the connectors on barges B and C were larger than for any of the other connectors. At all of the headings other than at 120 degrees, very little motion or extreme linkage connector bending was observed.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number SPD—P—645—01.

199560
MODEL FOR OPERATIONAL AND ECONOMIC EVALUATION OF INTEGRATED TUG/BARGE SYSTEM

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

User's Manual, S—5—5541—AAP—E, March 31, 1973

This is a user's manual which contains the procedure to activate the computer model, input preparation, the procedure to run with standard input file, a flow chart of program operation, and a sample run. The computer model has the capability of designing ships or integrated tug/barges that are aimed at carrying four different types of cargoes, e.g., liquid bulk, neo—bulk, dry bulk and containers. The model also has built—in economic routines to evaluate the economic value of the ships or tug/barges being designed, using required freight rate as index of comparison against the background of an anticipated trade route environment. It is adapted to the General Electric MK III network and can be accessed with a terminal compatible with the network.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5541—APP—E.

199564
DEVELOPMENT OF A MODEL FOR ECONOMIC AND OPERATIONAL EVALUATION OF INTEGRATED TUG/BARGE SYSTEMS

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, S—5—5441—FR, March 31, 1975

This report describes the development of a computer model which generates characteristics of integrated tug/barge systems, simulates trade route conditions, "operates" the tug/barge system on the trade route and evaluates the economics by means of a "required freight rate" analysis.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5441—FR.

199588
INTERACTION FORCES AND STRUCTURAL RESPONSE IN A SEAWAY OF THE INTEGRATED TUG/BARGE COMBINATION

Ingram Ocean Systems Incorporated and Breit Engineering, Incorported, New Orleans, Louisiana

Final Report, IOS—5—I, May 1974

The advent of the ocean—going tug/barge system provided the necessary impetus for the Maritime Administration to undertake and sponsor an intensified study of full scale measurements of the interactions of the tug/barge connections. One objective of the study is to compare the full scale forces at the connection with those obtained through model tests. Additionally, stresses at selective locations on the hull were to be determined from strain gauge data. A complete data acquisition system installed aboard the M/V Martha R. Ingram tug combines all data gathering functions in solid state modular units. At sea, electrical dynamic outputs from rosettes, accelerometers, pressure transducers, linear displacement transducers, wind direction indicator, anemometer, engine r.p.m. and bow wave height sensor are sensed, digitized, and recorded on magnetic tape by the onboard multiplexer. The dynamic behavior of the tug/barge system in a variety of sea conditions was then analyzed using an IBM 7094 and an IBM 1130. Ship motions and forces were compared with model test analysis to evaluate the performance of the connection and the total system hydrodynamic response. The supplement to this report describes the vessels, the data acquisition system and the sensors, including calibration and instrument accuracy. Analysis, conclusions and recommendations are embodied in this report.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number IOS—5—I.

199592
LITERATURE ON FLEXIBLE CONNECTORS FOR BARGES

Hirasaki, MP

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—272—21000—R4, May 1974, 11pp

An early project within the Tug/Barge Program at the Maritime Administration's National Maritime Research Center — Galveston was the evaluation of improved linkages for pushed barge trains to permit ocean use of those trains. A resultant report ("Program for the Development of Barge Train Linkage Systems" NMRC—272—21000—R3) was published in August, 1973. This report (NMRC—272—21000—R4) is a listing of linkage patents and magazine articles considered pertinent to the state—of—the—art survey performed as the basis for the R3 report.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—272—21000—R4.

130676
ANALYSIS OF MARINE FUEL CONSUMPTION AND SALES

Binkley, J

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, NMRC—KP—145, Aug 1975, 38pp

Results are presented of a compilation and analysis of available marine fuel data. An estimate of the total fuel requirements of the U.S. flag fleet is given and an analysis of marine fuel sales data is made covering sales to ships of all flags in U.S. ports. Trends of fuel consumption for the years 1970 to 1974 are given in tabular fuel——residual or distillate——and the source——domestic or bonded (foreign). The total sales of fuel in U.S. ports to ships of all flags in 1973 are shown to have been about two—thirds of the overall U.S. fleet requirements.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $4.00 PB—246 602/7GA; Microfiche $2.25.

151323
ENERGY RECOVERY SYSTEM FOR SHIPS

Yuengling, D Baki, A Richard, J

M. Rosenblatt & Son, Incorporated, Arlington, Virginia

Final Report, MA—RD—930—77014, Dec 1976, 183pp

The volume reports the results of a feasibility investigation of various heat recovery concepts which may be incorporated in an existing marine steam plant. The use of different refrigerant fluids, as well as different types of energy recovery units, is examined; and a plan is developed for prototype development, installation and test.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—262124/1ST.

166253
LOW EXCESS AIR HIGH PERFORMANCE MARINE BURNER/COMBUSTION SYSTEM. PHASE II. SMALL SCALE PROTOTYPE TESTS FOR UNITED STATES DEPARTMENT OF COMMERCE,MARITIME ADMINISTRATION

Bjerklie, JW LaHaye, PG

Hague International Corporation, 3 Adams Street, South Portland, Maine 04106

77R163, 47pp

An experimental study was performed on a massive recirculation, 3,000,000 btu/hr, low excess air burner operating in a Cleaver—Brooks Mini—4 boiler. Successful operation was achieved with 1/2 to 1 1/2% excess air and Bacharach smoke ratings of 4 to 6 (zero to trace of smoke visible in stack) while burning No. 6 fuel oil at a temperature of 180F. Recirculation ratios on the order of unity were measured. NOx levels were held to 165 to 220 ppm for the No. 6 fuel oil tested, containing 0.1% fuel bound nitrogen. The apparent turndown capability is at least 5/1 with 11.1 inches w.c. available combustion air pressure difference. No structural problems were noted within the burner. Deposits within the burner were essentially nonexistent. It is recommended that a much larger scale test be undertaken aimed toward marine boiler application for residual fuel combustion. It should result in lower smoke at 1% excess air than found in this small scale test.

NTIS

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166715
UTILIZATION OF URANIUM COST/BENEFIT STUDY FOR NUCLEAR POWERED MERCHANT SHIPS

Smith, ER

NUS Corporation, 4 Research Place, Rockville, Maryland 20850

NUS—1843, 64pp

This study presents a cost/benefit analysis for the utilization of uranium in merchant ships versus the use of uranium for the generation of electricity in central power stations. The study concludes that an alternative naval fuel to oil must be developed for the merchant marine to reduce U.S. dependency upon foreign supplies of a critical fuel. The study further indicates that use of uranium for ship propulsion results in transport of large quantities of needed import/exports while the residual oil saved will generate the same quantity of electricity in a central power station as the uranium used for ship propulsion.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—268905/7ST.

175125
THE POSSIBLE EFFECT OF RATIONALIZATION ON MARITIME FUEL CONSUMPTION

Binkley, J

National Maritime Research Center, Kings Point, New York 11024

NMRC—KP—147, Oct 1975, 49pp

This report deals with the fuel savings the maritime industry might potentially realize if its operations were rationalized, that is, if the carriers in a trade were to jointly optimize their operations with the consent of regulatory agencies.

NTIS

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181022
INVESTMENT IN COMMERCIAL DEVELOPMENT OF OCEAN THERMAL ENERGY CONVERSION (OTEC) PLANT—SHIPS

Francis, EJ

Applied Physics Laboratory, Johns Hopkins Road, Laurel, Maryland 20810

MA—RD—920—78038, 227pp

Significant increases in energy prices can adversely affect U.S. overall standard of living and the already large deficits in our balance of payments. Of the alternatives to fossil fuels and nuclear power, Ocean Thermal Energy Conversion (OTEC) offers the greatest promise for substantial relief. In addition to initial use of OTEC ammonia for production of fertilizers and industrial chemicals, OTEC ammonia can be used as a hydrogen carrier for production of electricity. The report recommends that OTEC/ammonia plant ships be given high priority and substantial funding within a National Energy Plan.

NTIS

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199405
COST SUMMARY OF THE 1968 N.S. SAVANNAH FUEL SHUFFLE

Todd Shipyards Corporation, Galveston, Texas 77553

Final Report, NMRC—640.1—R—1, June 1976, 19pp

The total cost of the fuel shuffle of the N.S. SAVANNAH core was approximately $3,962,400. This includes $1,920,700 for facility fixed assets: staffing, training, and writing procedures costs of $767,700 during the 8 month preparation period; and non—repetitive costs for maintenance and repair of $439,600. The nuclear related expenditures during the 2 month refueling are estimated at $556,200 and includes staff, health physics coverage, materials and subcontracts. The estimated repetitive cost of $767,700 for the preparation phase would be reduced significantly for subsequent refuelings and as facility utilization increases.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—640.1—R—1.

199440
INTRODUCTION TO NUCLEAR MERCHANT SHIP REFUELING FACILITIES AND MANNING REQUIREMENTS

Brown, RE

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—272—24000—R3, Oct 1973, 54pp

This report presents an evaluation of present nuclear merchant ship refueling facilities and identifies the facilities and estimated manning to support refueling and other reactor servicing for advanced design nuclear power merchant ships.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—272—24000—R3.

199444
MARITIME FUEL ASSEMBLY MECHANICAL AND HYDRAULIC EVALUATION

North, DC Pfund, RA

Babcock and Wilcox Company, Research and Development Division, Alliance, Ohio

Final Report, BAW—5184—ES

A cost competitive nuclear merchant ship requires a reactor core of different design than an electric utility power plant. The fuel assemblies in the core will be exposed to additional force inputs as a result of ship motions and their service life will be longer. The mechanical and hydraulic evaluation of the maritime fuel assembly included test to determine: natural frequency and damping; torsional and cantilever bending; dynamic and static deflection; pressure drop and lift off; flow induced vibration; relative motion between fuel rod and spacer grid; spacer grid cyclic strength. The fuel assembly design was found to be satisfactory with the exception of the upper end fitting. The end fitting will be redesigned and tested in the next phase of the program.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAW—5184—ES.

199449
IMPACT OF DEGRADED MARINE FUELS ON MARINE PROPULSION EQUIPMENT AND SYSTEMS

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, S—5—5580, Oct 10, 1977, 192pp

This report examines the impact of degraded fuels on marine propulsion equipment and systems. The use of the specified degraded fuel in steam power plants is reviewed and its impact on boiler design and maintenance is analyzed. The effect of the high fuel viscosity on the fuel storage, transfer, and service systems is defined and the necessary changes to the systems are outlined. The necessary blending of the specified degraded fuels is established and results in an intermediate degraded fuel that can be burned in marine medium speed diesels with acceptable increase in maintenance. Water washing of the fuel is necessary to reduce the amount of contaminants but the fuel viscosity has no effect on the design of the fuel piping systems. An economic evaluation studying the effect of the burning of these degraded fuels in both steam and diesel power plants is included.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, PB—272—727.

199474
POSSIBLE FUTURE MARINE FUELS

Silla, H

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, NMRC—KP—164, Nov 1977, 30pp

Several possible future synthetic fuels for marine transportation are compared. The production, handling, and utilization of these fuels are discussed. Particular emphasis is placed on hydrogen, ammonia, and hydrazine. The difficulty of predicting which one of the synthetic fuels will dominate makes it necessary to keep abreast of developments with all the fuels. Presently, ammonia should be studied as a possible hydrogen carrier because of its improved storability as compared to hydrogen. Also, recycling carbon dioxide which then can be converted into methane or methanol should be studied.

NTIS
Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—KP—164.

199495
EVALUATION OF MARITIME INDUSTRY ENERGY CONSUMPTION PROFILES

Spann, GW Hooper, NJ Bonham, CH Mason, RM
Grocki, JJ Hall, C

Metrics, Incorporated, Atlanta, Georgia 30339

Final Report, MET—4—E, Dec 1977, 113pp

The project's purpose was the development of a voluntary energy consumption reporting system for the maritime industry. The project was scheduled in three phases: Phase I included the development of appropriate measure of output and energy efficiency for different categories within the maritime industry and the estimation of energy consumption in each of the different categories; Phase II included the development and testing of survey questionnaires; Phase III included the implementation of the reporting system and the development and implementation of computer—based methods for analyzing the reported data.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MET—4—E.

199516
MEASUREMENTS OF VOLATILE AND NONVOLATILE HYDROCARBONS IN SELECTED AREAS OF THE ATLANTIC OCEAN

Brown, RA Searl, TD Prestridge, EB

Exxon Research and Engineering Company, Analytical and Information Division, Linden, New Jersey

Final Report, MA—RD—920—75063, June 1975, 45pp

An earlier study covered the measurement and interpretation of total dispersed nonvolatile hydrocarbons and extractable organics in the Atlantic and nearby waters. This report discusses results of a subsequent study in selected areas of the Atlantic Ocean. Samples were analyzed as collected from a previously sampled area around Iceland and near the coast of Greenland. Data for surface and subsurface (—10 meter) water agree with previous measurements. A previously unsampled area off the northeast coast of South America was found to contain hydrocarbons and extractable organics at about the same level as the northern waters. Volatile (C4—C8) hydrocarbons were measured in some surface samples from along the Gulf of Mexico/New York City tanker route.

NTIS
Maritime Administration

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199644
MARINE BUNKER FUELS: ANALYSIS AND FORECAST OF PRICE AND AVAILABILITY

Mortada International, 7616 LBJ Freeway, Suite 406, Dallas, Texas 75251

Final Report, MA—RD—920—78068, Oct 1978, 148pp

This study develops forecasts through 1993 of the refiner's acquisition costs for crude oil from domestic sources and for crude oil imports. Domestic crude oil price and availability are analyzed by producing region, taking into account the effects of energy legislation on domestic crude oil prices. The level of imports is based on U.S. energy requirements and the supply of energy from domestic sources. The prices of marine bunker fuels are forecast based on the refiner's acquisition costs of crude oil and the processing and desulfurization costs. The effects of the rising ratio of high to low sulfur crude oil on the availability of marine bunker fuels are analyzed. The study concludes that the prices of marine bunker fuels will increase in real terms throughout the forecast horizon, with marine diesel fuel prices increasing at a real rate of between 1.54% and 3.85% per annum, and high sulfur bunker C increasing at a real rate of between 0.09% ad 2.71% per annum. The fuel consumption of vessels engaged in the U.S. foreign trade and in the U.S. ocean trade is developed by type of service. The effects of marine bunker fuel prices on vessel operations are examined.

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Maritime Administration

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199674
THE INFLUENCE OF FUEL ON THE PERFORMANCE, OPERATION AND MAINTENANCE OF DIESEL PROPULSION ENGINES

Seaworthy Engine Systems, Incorporated, 73 Main Street, Essex, Connecticut 06426

Final Report, March 1979, 186pp

This report examines the influence of fuel quality on the performance, operation, and maintenance of medium speed and low speed diesel propulsion engines. The use of different commercial blends of marine fuel oil in both types of diesel engines is reviewed, and the influence of fuel quality is examined for the main diesel engine and major support systems. Fuel quality and the required fuel conditioning must be considered together to determine the total impact on the diesel. Load factor, lube oil system, and engine operating temperatures are other major contributing system factors evaluated in the study. An economic evaluation of the influence of fuel quality on the diesel engine is also included.

NTIS
Maritime Administration

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048102
SHIPPING OPERATIONS INFORMATION SYSTEM. VOLUME 1: EXECUTIVE SUMMARY

Giroux, E

Computer Sciences Corporation, 6565 Arlington Blvd, Falls Church, Virginia 22046

Final Report, May 1973, 75pp

The report describes an assessment of requirements for a shipping operations information system to be developed jointly by the Maritime Administration and selected U. S. flag ocean carriers. To be developed progressively in breadth and depth of capability, the system consists of four major services — cargo space documentation, intermodal distribution coordination, fleet resource management, and maritime industry reporting — each responsive to a particular set of maritime community needs. Within each service modular computer programs are to carry out individual tasks on call while being stored at a central facility in conjunction with the necessary data files accessible on either a common or proprietary basis. A nationwide communcations network allows for local remote terminal access to the system offering common usage to U. S. shipping companies.

NTIS

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097564
FOREIGN MARITIME AIDS

Kaplan, JJ Hatfield, RV

Collett, Gatenby and Hatfield, Incorporated, Arlington, Virginia

MA—GEN—371—75039, Dec 1974, 291pp

The document reports on aids provided by principal maritime nations to their shipping and shipbuilding industries. The study covers Japan, Spain, Sweden, Germany, Norway. France, and the United Kingdom.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $8.75 COM—75—10093/3GA; Microfiche $2.25.

097572
U.S. OCEAN SHIPPING TECHNOLOGY FORECAST AND ASSESSMENT. VOLUME I. SUMMARY REPORT

Blackman, AW

United Aircraft Research Laboratories, East Hartford, Connecticut 06108

MA/RD—940—75034, 220pp

This study has evaluated the current state of technology in the maritime industry and projected technological capabilities for the next 25 years. Evaluations were made of the impacts of the key maritime industry sectors technology in the future of the U.S. Maritime industry and the nation. Those evaluations included a quantitative impact analysis of economic and social factors for the 1975—1985 time period. Action options and their consequences were developed and the problems and constraints analyzed.

NTIS

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130519
TOWARD AN IMPROVED U.S. MERCHANT MARINE: A RECOMMENDED PROGRAM OF STUDIES

Maritime Transportation Research Board, 2101 Constitution Avenue, NW, Washington, DC 20418

Jan 1976, 105pp

This report describes the development and current status of the U.S. Merchant Marine with special emphasis on the influences of government, management, labor, and users. The report describes a wide spectrum of maritime activities, including the roles of various government agencies, the organization and effectiveness of U.S. Merchant Marine management, the structure and impact of labor—management relations, the reaction of current and potential users. The recommendations are listed in priority order and range from major research on the effects of bilateral trade policies to less comprehensive studies on the ways and means of encouraging the study of ocean transportation in major colleges of business administration. Recommendations are also made for studies in marketing, labor relations, and government activities.

Maritime Transportation Research Board

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143669
MARITIME AND CONSTRUCTION ASPECTS OF OCEAN THERMAL ENERGY CONVERSION (OTEC) PLANT SHIPS

Avery, WH Blevins, RW Dugger, GL Francis, EJ

Applied Physics Laboratory, Johns Hopkins Road, Laurel, Maryland 20810

MA/RD—940—T76065, 41pp

An analysis of the maritime, construction, and cost aspects of Ocean Thermal Energy Conversion (OTEC) plant—ships for deployment in tropical oceans to produce ammonia and other energy—intensive products is given. A concept has been developed for OTEC plant—ships for use at selected sites in tropical oceans to produce energy—intensive products on—board. These platforms will be very stable under normal operating conditions and could serve many other needs.

NTIS

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148195
A STATISTICAL ANALYSIS OF THE WORLD'S MERCHANT FLEETS: SHOWING AGE, SIZE, SPEED, AND DRAFT BY FREQUENCY GROUPING AS OF DECEMBER 31,1975

Maritime Administration, Washington, DC 20230

Dec 1975, 375pp

The report is a statistical analysis of the world's merchant fleet and includes only those merchant type ships of 1,000 gross tons and over. It excludes those operating exclusively on the Great Lakes and such special types as cable ships, icebreakers, trawlers, etc. and those owned by the military forces. Countries having a total of 100 or more mechant ships under their flags of registry are shown separately while those having less than 100 ships are grouped under the heading "All Others." The ships in the fleet are divided into four major types, namely; COMBINATON PASSENGER AND CARGO SHIPS, i.e., ships with a capacity for 13 or more passengers; FREIGHTERS (includes containerships, car carriers, roll/on—roll/off, and LASH Ships, etc.); BULK CARRIERS

(includes bulk/oil, ore/oil, and ore/bulk/oil carriers); and TANKERS (includes molten sulphur tankers, chemical tankers, liquefied petroleum and natural gas tankers, and whaling tankers).

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

158686
REPORT OF THE NATIONAL PLANNING CONFERENCE ON THE COMMERCIAL DEVELOPMENT OF THE OCEANS, HELD AT WARRENTON, VIRGINIA, JUNE 9—11, 1976. VOLUME 2. PROGRAM ELEMENTS

BDM Corporation, 7915 Jones Branch Drive, McLean, Virginia 22101

MA—GEN—900—77—73, June 1976, 243pp

A group of 145 senior representatives from government, industry, academia and public interest groups attended the conference to chart a work plan for the nation's future development of the oceans. Volume II contains all of the program elements that were recommended by the conference.

NTIS

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168245
THE MARITIME AIDS OF THE SIX MAJOR MARITIME NATIONS

Maritime Administration, Washington, DC 20230

71—75, Sept 1977, 491pp

The report examines the financial assistance programs administered by the six major nations to their shipping and shipbuilding industries. The study, which covers the period 1971—1975, details the assistance rendered and evalutes their effectiveness. The nations studied——Japan, the United Kingdom, Norway, Sweden, West Germany, and France——in 1975 occupied the six top positions in the world in terms of gross tons of shipbuilding deliveries and accounted for 37 percent of the world's fleet tonnage. The report reveals that during the 1971—1975 period the assistance given to the shipping industries of the six nations averaged over $1.1 billion per year. In addition, the shipbuilding industries of these countries received an average of $475 million per year. The analyses of the maritime aids included investment financing assistance, credit assistance, tax allowance programs, direct subsidies, cargo preference programs on particular commodities, full or partial government ownership and other forms of government assistance.

Maritime Administration

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168764
METRIC CONVERSION STUDY FOR THE MARITIME ADMINISTRATION

J.J. Henry Company, Incorporated, 2341 Jefferson Davis Highway, Arlington, Virginia 22202

Final Report, MA—SC—723—77116 June 14, 1977, 56pp

This report was prepared for the purpose of developing a master plan for the conversion to the metric system on the part of the Maritime Administration. It includes recommendations and interrelationships among the maritime industry for accomplishing these objectives. A Maritime Metric Practice Guide will be available from the Maritime Administration.

NTIS

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172374
CORPORATE MANAGEMENT INFORMATION SYSTEM——EXECUTIVE SUMMARY

Hitt, J

Pacific Far East Line, San Francisco, California 94111

Aug 1976, 19pp

This report describes a system of computer programs which has been designed to simulate, project and report voyage revenue and costs throughout the several phases of a voyage: planning prior to voyage commencement; preliminary estimates of voyage results while in progress; final estimates of voyage results after termination, and the analysis and reporting of actual revenue and cost information on a historical basis.

Maritime Administration

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199308
U.S. SHIPPING TECHNOLOGY FORECAST AND ASSESSMENT: VOLUME II

Blackman, AW

United Aircraft Research Laboratories, East Hartford, Connecticut 06108

Task I, Technology Assessment Definition, MA—RD—940—75035, July 1974, 318pp

This study has evaluated the current state of technology in the maritime industry and projected technological capabilities for the next 25 years. Evaluations were made of the impacts of the key maritime industry sectors' technology in the future of the U.S. maritime industry and the nation. These evaluations included a quantitative impact analysis of economic and social factors for the 1975—1985 time period. Action options and their consequences were developed and the problems and constraints analyzed.

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Maritime Administration

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199309
U.S. OCEAN SHIPPING TECHNOLOGY FORECAST AND ASSESSMENT: VOLUME III

Blackman, AW

United Aircraft Research Laboratories, East Hartford, Connecticut 06108

Task II, State of Maritime Technology, MA—RD—940—75036, July 1974, 276pp

Contents: pollution control technology; cargo handling; warehousing and consolidation; equipment control and information processing; cargo feeder systems; vessel traffic control; cargo preparations; vessel operations; vessel structure; materials; channels and anchorages; full and semi—submersible hull form technology; hydrofoil and air cushion hull form technology; displacement hull forms; power generation; thrust devices; stopping distances; ship motions control; navigation systems; ship design and engineering; ship construction; shipyard computer systems technology; outfitting facilities; machine control technology; modal—split forecasts.

NTIS
Maritime Administration

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199310
U.S. OCEAN SHIPPING TECHNOLOGY FORECAST AND ASSESSMENT: VOLUME IV

Blackman, AW

United Aircraft Research Laboratories, East Hartford, Connecticut 06108

Task III, State of Society and Industry, July 1974, 412pp

The primary objective of Task III was the preliminary identification of social factors which may impinge on maritime developments or which may be affected by them, and to forecast the most likely future course of these factors.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—75—10004, See also Volume III, COM—75—10003 and Volume V, COM—75—10005. Paper copy also available in set of six reports as COM—75—10171—SET, PC $44.00

199311
U.S. OCEAN SHIPPING TECHNOLOGY FORECAST AND ASSESSMENT: VOLUME V

Blackman, AW

United Aircraft Research Laboratories, East Hartford, Connecticut 06108

Tasks IV and V, Impact Analysis and Policy Options,
MA—RD—940—75038, July 1974, 416pp

Task IV was aimed at defining the elements of society most likely to be affected by new technological developments in the maritime industry. Task V served to identify: (1) the effects of certain future events on the technological, economic and societal trends of concern in this study, including potential blockages to beneficial events, and means for eliminating these blockages; and (2) the effect of forecast technology improvements on ship design and, hence, on the health of the U.S. maritime industry and the U.S. economy.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—75—10005. See also Volume IV, COM—75—10004 and Executive Summary, COM—75—10006. Paper copy also available in set of six reports as COM—75—10171—SET, PC $44.00.

199312
U.S. OCEAN SHIPPING TECHNOLOGY FORECAST AND ASSESSMENT

Blackman, AW

United Aircraft Research Laboratories, East Hartford, Connecticut 06108

Executive Summary, MA—RD—940—75033, July 1974, 30pp

Contents: forecasts of major figures of merit; forecasts for major shipping systems; technology assessment; policy options.

NTIS
Maritime Administration

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199316
MARITIME FUEL PRICE AND AVAILABILITY, 1975—2000

TETRA Tech, Incorporated, Arlington, Virginia

Final Report, MA—RD—920—75021, Apr 12, 1975, 219pp

Presented is an in—depth analysis of the inter—relationship between marine fuel and the total energy market and the impact of the recent price and conservation developments on the future price and availability of marine fuels. Price and availability of marine fuels in the U.S. for the near term (1975—1985) and the far term (1985—2000) are projected.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—75—10543.

199352
EXECUTIVE SUMMARY OF THE CORPORATION MANAGEMENT INFORMATION SYSTEM

Peat, Marwick, Mitchell & Company, Incorporated, Washington, DC 20036

Executive Summary, P—35—CM, Aug 1976

The report summarizes the concepts and capabilities of the Corporate Management Information System (CMIS) completed and installed at Pacific Far East Line. A system was developed to simulate, project, and report voyage revenue and costs throughout the several phases of a voyage: planning, preliminary estimates after termination, and analysis and reporting of actual revenue and cost information on a historical basis.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number P—35—CM.

199431
PROGRAM MANAGEMENT PLAN: RELIABILITY AND MAINTAINABILITY IMPROVEMENT PROGRAM FOR THE U.S. MERCHANT FLEET

McCarthy, T Packard, ST

ARINC Research Corporation, Santa Ana, California

Final Report, NMRC—KP—171—3, May 1977, 48pp

The report discusses the need for a reliability and maintainability improvement program for the U.S. merchant shipping industry. The report provides an overview of the entire program, describes the management and technical approaches to be used, describes each phase of the program, and describes the expected benefits of the program.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, PB—268—565.

199483
U.S. OCEAN SHIPPING TECHNOLOGY FORECAST AND ASSESSMENT: VOLUME I

Blackman, AW

United Aircraft Research Laboratories, East Hartford, Connecticut 06108

Executive Summary, MA—RD—940—75033, July 1974, 220pp

This study has evaluated the current state of technology in the maritime industry and projected technological capabilities for the next 25 years. Evaluations were made of the impacts of the key maritime industry sectors' technology in the future of the U.S. maritime industry and the nation's. These evaluations included a quantitative impact analysis of economic and social factors for the 1975—1985 time period. Action options and their consequences were developed and the problems and constraints analyzed.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—75—10001.

199491
CAORF BASIC AND APPLIED RESEARCH TOPICS

The Charles Stark Draper Laboratory, Cambridge, Massachusetts 02139

Final Report, CSDL—C—3906, March 7, 1973

This report contains a compilation of CAORF basic and applied research topics previously recommended by the following organizations: The Charles Stark Draper Laboratory, The MITRE Corporation, Sperry Systems Management Division, National Maritime Research Center (Kings Point), National Maritime Research Center (Galveston), and the Maritime Administration (Washington).

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number CSDL—C—3906.

199494
NEW PROGRAM PLANNING, INNOVATIVE CONCEPTS AND AREAS OF TECHNOLOGY FRONTIERS

Schell, T Overly, DH Stern, MO

International Research and Technology Corporation, Arlington, Virginia 22209

Research Methodology Report, NMRC—KP—108, July 1973

This report focuses in detail on the framework required for generating and selecting those research tasks that should make up a five year plan for NMRC—KP.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—KP—108.

199530
DEVELOPMENT OF AN ENERGY REPORTING SYSTEM FOR THE MARITIME INDUSTRY

Wright, BD Spann, GW Spurlack, JM Mason, RM

Metrics, Incorporated, Atlanta, Georgia 30339

Executive Summary, MET—4—D, March 1977, 111pp

This report is based upon work performed to develop a maritime industry energy reporting system (MARINERS). The purpose of this report is to present the results of a survey of sample firms in the maritime industry. The survey included requests for numerical data on amounts of fuel consumed (by activity or operation) and outputs (e.g., cargo ton, miles, cargo tons handled).

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MET—4—D.

199553
PROCEEDINGS OF THE NATIONAL SYMPOSIUM ON MARINE TRANSPORTATION MANAGEMENT

College of Marine Studies, University of Delaware, Delaware

Proceedings Report, D—45—N, Nov 1975, 132pp

The symposium addressed the following topics: marine traffic management, technology, personnel training and evaluation, federal roles in maritime transportation system management. Workshops reported on: waterway operations, system safety and maintenance, management and training, and new technology assessment and system design.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number D—45—N.

199603
MARITIME SHIP DATA SYSTEM: EXECUTIVE SUMMARY

Marine Management Systems, Incorporated, 300 Broad Street, Stamford, Connecticut 06901

Dec 1978

This report describes the activities carried out to design, develop, and install an automated system for updating the ship characteristics data base which is maintained by the Maritime Administration. This report also contains a description of the 84 data elements maintained in the data base. As an extension to the Maritime Ship Data System, vessel

position information has been linked to the Ship Data System. This merged information produces a file of all vessel port—pair transitions sorted by Marad trade route.

NTIS
Maritime Administration

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199642
LONG RANGE FLEET PLANNING STUDY: VESSEL CONFIGURATION SYSTEM: VOLUME II

Malinofsky, M Johnson, C

Farrell Lines, Incorporated, One Whitehall Street, New York, New York 10004

Aug 1978

This report covers the development and application of an optimum vessel configuration model in the context of Farrell Lines Trade Route 27 services from the U.S. Pacific Coast to Australia and New Zealand. The solution methodology selected was a linear programming technique employing a matrix of variables and constraints of large size. Included were considerations of commodity type, cargo technology, and port pairings. The model's output was interpreted and results presented for management action.

NTIS
Maritime Administration

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199643
LONG RANGE FLEET PLANNING STUDY: VESSEL CONFIGURATION SYSTEM

Malinofsky, M Johnson, C

Farrell Lines, Incorporated, One Whitehall Street, New York, New York 10004

Final Report, Aug 1978, 134pp

This report covers the development and application of an optimum vessel configuration model in the context of Farrell Lines Trade Route 27 services from the U.S. Pacific Coast to Australia and New Zealand. The solution methodology selected was a linear programming technique employing a matrix of variables and constraints of large size. Included were considerations of commodity type, cargo technology, and port pairings. The model's output was interpreted and results presented for management action.

NTIS
Maritime Administration

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084430
DECK AND ENGINE OFFICERS IN THE U.S. MERCHANT MARINE SUPPLY AND DEMAND, 1974—1984

Luciano, PJ

Maritime Administration, Washington, DC 20230

Final Report, MA—GEN—510—70008, May 1974, 80pp

The study is the third in a continuing series to provide industry and government with information needed for effective manpower planning. The results of the third study suggest that if current trends continue, a shortage of both deck and engine officers is likely before the end of this decade. Because of the sensitivity of this conclusion to various assumptions made in the study, the analysis will continue on a regular basis, as new data become available, in order to check the validity of the current results and to update other information needed for planning purposes.

NTIS

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130894
SEAFARING GUIDE AND DIRECTORY OF LABOR—MANAGEMENT AFFILIATIONS

Maritime Administration, Washington, DC 20230

June 1975, 43pp

This publication is a revised edition of the former "Guide to Seafaring Collective Bargaining 1969." It is designed to furnish collective bargaining information to government agencies, members of Congress, representatives of industry, and labor organizations concerned with maritime labor affairs.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

199351
ACQUISITIONS

National Maritime Research Center, Kings Point, New York 11024

Final Report, NMRC—KP—3—A, Dec 24 1977—Jan 16, 1978

This is a compilation of reports acquired by the National Maritime Research Center between December 24, 1977 and February 16, 1978.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—KP—3—A.

199473
SHIPBUILDING MANPOWER STUDY

Tudos, J Emery, R

Mark Battle Associates, Washington, DC

Executive Summary, MA—RD—900—74049, March 1974, 78pp

The report documents labor supply and demand on Atlantic coast, Pacific coast and Great Lakes areas. It assesses factors within shipyards such as employee turnover, layoffs, wages and wage patterns and training programs. It assesses external influencing availability of specialized skills in shipyards such as levels of unemployment, government training programs, wages and skills in competing industries. It forecasts industry requirements for skilled manpower through 1975.

NTIS
Maritime Administration

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199633
ANALYSIS OF COMPETITIVE PRACTICES IN THE MARITIME INDUSTRY

Marshall, RB Sletmo, GK

Webb Institute of Naval Architecture, Glen Cove, New York 11542

NMRC—KP—187, March 1978, 100pp

This report presents the results of a study into the competitive practices in the U.S. liner segment of the maritime industry. It begins with an introductory economic analysis of the industry and proceeds to a discussion of the methodology which resulted in the identification of fifty—nine separate issues that appear to have an adverse impact on the industry's efficiency and productivity. Research topics addressing each of the fifty—nine issues are then mentioned. An analysis of the topics follow in order to determine which appear to be most appropriate and fruitful for sponsorship as research projects by the Maritime Administration. This resulted in the selection of eleven "Key Issues" and the development of a plan for research in each area.

NTIS
Maritime Administration

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095115
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS—LEGAL AND REGULATORY CONSTRAINTS—APPENDICES

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

MA—RD—940—75017, Aug 1974, 8pp

Contents: Methodology of construction of the legal model; The legal model; National transportation policy; The Motor Carrier Act of 1935 as amended; Legal citations of selected state pollution control lows; Goals and policies; Laws and regulations; Intermodal common ownership; Discrimination rail rates; User charges; Illness and injury claims by employees and third parties; Federal pollution control penalties; Union negotiating power; Disparate state pollution control laws; Disparate state tax laws; Exclusion of Virgin Islands from sabotage laws; U. S. vessel construction equipment.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $11.50 COM—74—11712/8GA; Microfiche $2.25.

128224
THE MARITIME BULK COMMODITIES SIMULATION MODEL. VOLUME I. MANAGEMENT SUMMARY

Ernst & Ernst, Washington, DC 20036

Final Report, MA—GEN—970—76009, March 1975, 32pp

The report is the first of a three—volume set documenting the Maritime Bulk Commodities Simulation Model. The purpose of this volume is to provide an overview of the origins of the Model, its technical development and design aspects, and its potential uses and benefits.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $3.75 COM—75—11106/2GA; Microfiche $2.25.

146762
MARKET PENETRATION AND POTENTIAL FOR BARGE CARRYING VESSELS (BCVS)

Sletmo, GK Marshall, RB

Webb Institute of Naval Architecture, Glen Cove, New York 11542

NMRC—KP—166, 83pp

This report presents the findings of an investigation into the comparative cargo carrying performance of Barge Carrying Vessels (BCVs) versus break—bulk and containerships in certain U.S. liner services in 1972 and 1973. It is the second phase of a broader study designed to contribute toward improvement in the revenue performance of BCVs. The major thrust of this effort was a detailed commodity analysis supplemented by interviews with BCV operators and others familiar with the barge carrying system concept and operation. The report concludes that BCV operators by 1973 had made substantial inroads into existing liner service and were also capturing a share of traditional tramp business. The versatility of the barge carrying vessel with respect to cargo carrying capability is substantiated.

NTIS

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151613
OCEAN CARRIER SERVICE IMAGE AND MARKETING PRACTICES

International Maritime Associates, Incorporated, 1800 K Street, NW, Washington, DC 20006

Final Report, NMRC—KP—168, Aug 1976, 150pp

The study develops market feedback useful for fomulating ocean carrier marketing strategies. Specific attention is directed to perceptions that transport users have about the quality of service provided by ocean carriers. By comparing the results with specific marketing practices of individual carriers, it is possible to determine whether reorientation in marketing efforts would seem desirable. Information about carrier performance was gathered from exporters, importers, and freight forwarders.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—261181/2ST.

168270
GREAT LAKES—OVERSEAS MARINE TRANSPORTATION MARKET ASSESSMENT. A BUSINESS PROPOSAL FOR U.S. FLAG OPERATIONS. EXECUTIVE SUMMARY

Simat, Helliesen and Eichner, Incorporated, 1019 19th Street, NW, Washington, DC 20036

Feb 1977, 16pp

The study establishes the essential criteria for successful U.S. flag operations to and from the nation's fourth seacoast. By employing market surveys, modal split analyses and required freight rate models, the study evaluates 42 variations of alternative marine transportation systems as potential competitors in a Great Lakes—Overseas System. The study recommends two specific systems and develops the required management, financial and marketing plans.

NTIS

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168271
GREAT LAKES—OVERSEAS MARINE TRANSPORTATION MARKET ASSESSMENT. A BUSINESS PROPOSAL FOR U.S. FLAG OPERATIONS. VOLUME I

Simat, Helliesen and Eichner, Incorporated, 1019 19th Street, NW, Washington, DC 20036

Feb 1977, 200pp

The Great Lakes—Overseass Marine Transportation Market Assessment is a comprehensive study of commercial marine operations in foreign trade between Great Lakes and overseas ports. In Volume 1, the study screens forty—one alternative liner cargo shipping systems and selects one, an all—container service, as having the highest potential for success. This system is fully developed in a business proposal with management, financial, and marketing plans.

NTIS

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168272
GREAT LAKES—OVERSEAS MARINE TRANSPORTATION MARKET ASSESSMENT. A BUSINESS PROPOSAL FOR U.S. FLAG OPERATIONS. SUPPLEMENT TO VOLUME I

Simat, Helliesen and Eichner, Incorporated, 1019 19th Street, NW, Washington, DC 20036

Feb 1977, 84pp

Contents: Vessel Operations; Cargo Service Patterns; Ports; Hinterland Transportation; Great Lakes/Overseas Transportation Networks; U.S. Rail/Water Gulf; Failure to Penetrate Market; Market Analysis; Alternative Systems Considered; The Selected System——Description.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—265048/9SL.

168273
GREAT LAKES—OVERSEAS MARINE TRANSPORTATION MARKET ASSESSMENT. A BUSINESS PROPOSAL FOR U.S. FLAG OPERATIONS. VOLUME II. APPENDICES

Simat, Helliesen and Eichner, Incorporated, 1019 19th Street, NW, Washington, DC 20036

Feb 1977, 326pp

Contents: Port Profiles; Railroad Candidates for Cooperative Rates and Services via Great Lakes Ports; Questions and answers Concerning Availability of Construction and Operating Differential Subsidy for U.S. Flag Great Lakes/Overseas Operators; Personal Interview Survey of Great Lakes Hinterland Shippers; Confidential Questionnaire Survey of Major Shippers/Importers in the Great Lakes Hinterland; 1973 Origin/Destination Data for High Penetration States to U.K.—Western Europe; Advisory Panel; Physical Characteristics and Required Freight Rate Analysis; Total Transportation Cost Methodology; Maritime Marketing Strategy Model; Assumptions and Calculations Concerning Required Market Penetration. (Portions of this document are not fully legible.)

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—265049/7SL.

172371
MARITIME DATA CODING SYSTEM IMPROVEMENTS: FINAL REPORT

Stern, C

Data Architects, Incorporated, Waltham, Massachusetts 02154

Final Report, 7506—7611, Nov 1976, 22pp

This report describes improvements and modifications to the Maritime Administration's Maritime Data Coding System, developed and implemented originally in 1974. Numerous on—line edit and numerical checks and aids are described for processing of vessel utilization forms. In addition, a capability to process containerized cargo reporting data is described.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price.

172372
MARITIME DATA CODING SYSTEM: EXECUTIVE SUMMARY

Stern, C

Data Architects, Incorporated, Waltham, Massachusetts 02154

Executive Summary, 7206—7403, March 1974, 14pp

This report describes the development of a system for the Maritime Administration to provide an in—house capability for processing of preference cargo bills of lading. The report includes a description of the delivered system and the results of an operational evaluation.

Maritime Administration

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172373
SHIPPING OPERATIONS INFORMATION SYSTEM——STANDARD RECOMMENDATIONS

Ruthling, C

Computer Sciences Corporation, 6565 Arlington Blvd, Falls Church, Virginia 22046

Technical Study, June 1975, 26pp

This report describes recommended standards to be utilized by U.S. flag carriers in the development and documentation of computer program modules implemented as part of the joint MarAd/Industry Shipping Operations Information System program. These standards include data element codes such as commodity codes, location codes, patron codes, port codes and carrier codes.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price.

199317
MARKETING OF BARGE CARRYING VESSEL SERVICES

Binkley, J

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, NMRC—KP—121, Dec 1974, 52pp

This report of Project Phase I presents a brief overview of barge carrying vessel (BCV) systems today, and summarizes the viewpoints of shippers regarding these systems. Results are presented based on a series of interviews with ocean carrier personnel, government personnel, and others familiar with the working of LASH and Seabee systems, and with shippers who have and who have not made use of them.

NTIS
Maritime Administration

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199326
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: APPENDIX T

A. T. Kearney, Incorporated, Chicago, Illinois

Financial Data, MA—RD—900—73007—M, Apr 16, 1973, 124pp

The report contains financial data on inland waterways and domestic ocean carriers and provides supporting data for the financial analysis of same. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS Repr PC: Req. Price, COM—74—10421. Paper copy also available from NTIS $59.00/set of 11 reports as COM—74—10410—SET.

199327
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: APPENDIX F: THE DATA BASE FOR MARINE MARKETING

A. T. Kearney, Incorporated, Chicago, Illinois

MA—RD—900—73007—L, Feb 1974, 922pp

The report contains 1969 transportation tonnage data for water carriers, rail carriers, and non—exempt truck movements for all origin and destination regions (as defined by the Bureau of Economic Analysis, Department of Commerce) considered potentially susceptible to marine carriage. The data are summarized in 19 commodity groups and contains more than 12,500 origin region—destination region—commodity entries. Each lane is forecast in five year increments through the year 2000 based on BEA projections of employment by industry. Marine market share in the year 2000 is estimated. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—74—10420.

199328
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: APPENDIX C: MODAL SHARE ESTIMATES

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

MA—RD—900—73007—K, Feb 1974, 148pp

In the shipment of a commodity group from one region to another, the water mode's share of the total tonnage has been related to strategic variables: length of haul, circuitry, total tonnage moving, bulk or non—bulk character, commodity value, and location of producing and consuming sites in the regions. Highly significant regression equations showed length of haul to be the most important of these variables. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
Maritime Administration

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199330
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: APPENDIX A: DEVELOPMENT OF THE FORECASTING DATA BASE

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

MA—RD—900—73007—I, Feb 1974, 155pp

The data development of the historical trade flows by water, rail, and highway in the domestic commerce of the United States is described. Commodity groups, geographic regions, regional economic projections, tonnage allocation procedures and export—import data bases are described. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
Maritime Administration

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199331
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: FINANCIAL ANALYSIS OF DOMESTIC OCEAN CARRIERS

A. T. Kearney, Incorporated, Chicago, Illinois

MA—RD—900—73007—E, Feb 1974, 140pp

The report contains an analysis of the financial structure and health of maritime carriers operating on the domestic ocean. Financial information was derived from Federal Maritime Commission files and published Interstate Commerce Commission sources. Individual carrier data are not identified. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
Maritime Administration

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199332
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: FINANCIAL ANALYSIS OF INLAND WATERWAYS CARRIERS

A. T. Kearney, Incorporated, Chicago, Illinois

MA—RD—900—73007—D, Oct 31, 1973, 79pp

The report contains an analysis of the financial structure and financial operating statistics of selected inland waterways carriers. The report also includes comparisons with other surface transportation modes and among sub—groups of inland waterways carriers. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
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199333
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: GREAT LAKES TRADE AREA REPORT

A. T. Kearney, Incorporated, Chicago, Illinois

Final Report, MA—RD—900—73007—C, Feb 1974, 283pp

The report includes an assessment of the present and probable future market prospects for marine transportation in domestic service on the Great Lakes. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
Maritime Administration

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199335
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: DOMESTIC OCEAN TRADE AREA

A. T. Kearney, Incorporated, Chicago, Illinois

Final Report, MA—RD—900—73007—B, Feb 1974, 442pp

The report presents an assessment of the present and probable future market prospects for marine transportation on the domestic ocean, consisting of coastwise and intercoastal service and service to/from Puerto Rico, Hawaii and Alaska. It includes a review of financial structure and prospects for carriers as a group. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
Maritime Administration

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199336
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: EXECUTIVE SUMMARY

A. T. Kearney, Incorporated, Chicago, Illinois

MA—RD—900—73007, Feb 1974, 36pp

The report presents the executive summary of the entire study effort which assesses the present and probable future market prospects for domestic marine transportation. It covers three trade areas: inland waterways, domestic ocean (coastwise and intercoastal, Puerto Rico, Hawaii and Alaska) and the Great Lakes. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
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199337
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: INLAND WATERWAYS TRADE AREA

A. T. Kearney, Incorporated, Chicago, Illinois

Final Report, MA—RD—900—73007—A, Feb 1974, 325pp

An assessment of the present and probable future market prospects for domestic marine transportation on the inland waterways of the United States is presented. The report includes discussion of present and probable future commodity movements, marketing strategies for inland waterways carriers, financial and legal overview. Eleven reports are available as part of this market analysis. These include the Executive Summary, three trade area reports, two financial analyses, and appendices A, B, C, F, T.

NTIS
Maritime Administration

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199357
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: LEGAL AND REGULATORY CONSTRAINTS, DOMESTIC OCEAN

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

Final Report, L—5—DLD, Aug 1974, 16pp

This report covers the domestic ocean study area which has been defined as the domestic ocean sections of the nation which are served by waterways, or coastal waterways which are used by barges as opposed to deep draft ships. The domestic commodity movements have been forecast between specific origins and destinations for 19 specific commodity groups. The commodity movements dealt with in the forecasts are between points of production and points of consumption.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—5—DLD.

199358
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: LEGAL AND REGULATORY CONSTRAINTS, INLAND WATERWAYS

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

Final Report, L—5—DL1, Aug 1974, 20pp

This report summarizes the legal and regulatory constraints that affect the domestic water carriers on the inland waterways. The report identifies and develops a model of the major goals, policies, and laws and regulations affecting the U.S. domestic shipping industry, identifies important legal and regulatory constraints, determines the operations and economic effects of the constraints on the U.S. domestic shipping industry, and identifies important changes that might be made to relax constraints.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—5—DL1.

199359
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: LEGAL AND REGULATORY CONSTRAINTS, GREAT LAKES

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

Final Report, L—5—DLG, Aug 1974, 16pp

This report summarizes the legal and regulatory constraints that affect the domestic water carriers on the Great Lakes. The report identifies and develops a model of the major goals, policies, and laws and regulations affecting the U.S. domestic shipping industry, identifies important legal and regulatory constraints, determines the operational and economic effects of the constraints on the U.S. domestic shipping industry, and identifies important changes that might be made to relax constraints.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—5—DLG.

199360
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: FORECAST OF TRADE FLOWS, 1975—2000, DOMESTIC OCEAN

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

Final Report, L—5—DFD, Aug 1974, 181pp

A historical data base is compiled for domestic freight movements in order to forecast these movements to the end of this century. Commodities are classified into 19 groups, and forecasts for total flows are developed by econometric techniques as well as conventional methods.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—5—DFD.

199361
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: APPENDIX D: TRADE FLOWS AND FORECASTS

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

Final Report, L—5—AppD—Sect II—N—III—C, Aug 1974, 409—603pp

Appendix D examines trade flows and forecasts, and traces historical movements for commodity groups.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—5—DAppD—Sect II—N—III—C.

199363
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: APPENDIX B: FORECASTING METHODOLOGY

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

L—5—D--App.B, Aug 1974, 24pp

Appendix B describes the basic forecasting methodology used in the "econometrics forecasts" applicable to seventeen study commodity groups.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—5—D—App.B.

199366
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: FORECAST OF TRADE FLOWS, 1975—2000, GREAT LAKES

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

Final Report, L—5—DFG, Aug 1974, 83pp

This report covers the Great Lakes study area. In general, vessels operating on the Lakes are tied closely to the production of iron and steel. Analysis of commodity movements identifies the origin and destination of flows regionally. 19 commodities comprise the area of study.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—5—DFG.

199367
DOMESTIC WATERBORNE SHIPPING MARKET ANALYSIS: FORECAST OF TRADE FLOWS, 1975—2000, INLAND WATERWAYS

Arthur D. Little, Incorporated, Cambridge, Massachusetts 02140

Final Report, L—5—DF1, Aug 1974, 162pp

This report covers the Inland Waterways study area which has been defined as the inland sections of the nation which are served by waterways or coastal waterways which are used by barges as opposed to deep draft ships. The domestic commodity movements have been forecast between specific origins and destinations for 19 specific commodity groups. The commodity movements dealt within the forecasts are between points of production and points of consumption.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—5—DF1.

199384
MARAD IMPROVEMENTS CONTRACTS

Data Architects, Incorporated, Waltham, Massachusetts 02154

Final Report, DAI—35151—0, Nov 8, 1974

This report describes the original goals and actual achievements of computerized techniques in terms of reducing and analyzing cargo and vessel movement data from tens of thousands of industry supplied source documents annually.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number DAI—35151—0.

199433
GREAT LAKES — OVERSEAS MARINE TRANSPORTATION MARKET ASSESSMENT: A BUSINESS PROPOSAL FOR U.S. FLAG OPERATIONs: VOLUME II

Simat, Helliesen and Eichner, Incorporated, 1019 19th Street, NW, Washington, DC 20036

Appendices, MA—RD—940—77062—A, Feb 1977, 326pp

Contents: Port profiles; railroad candidates for cooperative rates and services via Great Lakes ports; questions and answers concerning availability of construction and operating differential subsidy for U.S. flag Great Lakes/overseas operators; personal interview survey of Great

Lakes hinterland shippers; confidential questionnaire survey of major shippers/importers in the Great Lakes hinterland; 1977 origin/destination data for high penetration routes to U.K. – Western Europe; advisory panel; physical characteristics and required freight rate analysis; total transportation cost methodology; maritime marketing strategy model; assumptions and calculations concerning required market penetration. (Portions of this document are not fully legible.)

NTIS
Maritime Administration

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199435
GREAT LAKES – OVERSEAS MARINE TRANSPORTATION MARKET ASSESSMENT: A BUSINESS PROPOSAL FOR U.S. FLAG OPERATIONS: VOLUME I

Simat, Helliesen and Eichner, Incorporated, 1019 19th street, NW, Washington, DC 20036

Final Report, MA–RD–940–77061, Feb 1977, 200pp

The Great Lakes – Overseas Marine Transportation Market Assessment is a comprehensive study of commercial marine operations in foreign trade between Great Lakes and overseas ports. In Volume I, the study screens forty–one alternative liner cargo shipping systems and selects one, an all–container service, as having the highest potential for success. This system is fully developed in a business proposal with management, financial, and marketing plans.

NTIS
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199463
OCEAN CARRIER MARKET BARRIERS AND OPPORTUNITIES

McCaul, JR

National Maritime Research Center, Kings Point, New York 11024

Final Report, NMRC–KP–148, Apr 1975, 100pp

This report is the latest study conducted by NMRC–KP analyzing the market performance of U.S. Carriers in the ocean liner shipping industry. This study develops and briefly examines the broad marketing framework within which ocean liner carriers conduct business, identifies the market barriers within which carrier marketing strategies are developed, and identifies through statistical survey the comparative strengths and weaknesses in the quality of service provided by U.S. and foreign–flag carriers. This report synthesizes quantitative and qualitative information about the liner market generated from two questionnaire surveys, and from personal interviews conducted with eleven U.S. liner carriers and more than thirty transport users.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC–KP–148.

199485
CONFERENCE ON MARKING AND LABELLING INTERMODAL CONTAINERS

Maritime Administration, Washington, DC 20230

Conference Report, M–3–CM, July 10, 1973, 71pp

The report examines the potential for improvements in the area of container marking and control.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: Government Printing Office, Washington, DC, 20402, Cost: $1.00.

199539
MARITIME MARKETING STRATEGY MODEL

Market Facts, Incorporated, Chicago, Illinois 60606

Final Report, MF–E–703, Dec 1975, 77pp

The Maritime Marketing Strategy Model was developed to provide carrier management with reliable and relatively quick estimates of the impact of different strategy alternatives. The model is based on proprietary methodology that has been applied on nearly 100 projects for major U.S. Corporations. It is constructed from a sample of 470 shippers and freight forwarders.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MF–E–703.

199600
EVALUATION OF A DOMESTIC FEEDER CONTAINER SERVICE ON THE ATLANTIC AND GULF COASTS

Booz Allen Applied Research, Incorporated, 4330 East West Highway, Bethesda, Maryland 20014

Executive Summary & Research, Feb 1979

This study examines a coastwise shipping service in the U.S. Gulf and Atlantic coasts and addresses: 1) definition of potential market, 2) analysis of service requirements and competitive factors, 3) definition of candidate systems, 4) evaluation of market penetration, 5) cost analysis, 6) evaluation of the legal environment, and 7) analysis of economic impact.

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Maritime Administration

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048095
EVALUATION OF MARITIME SATELLITE COMMUNICATIONS FOR INLAND WATERWAYS

Anderson, RE

General Electric Company, Schenectady, New York 12306

Final Report, GE—SRD—73—038, Jan 1973, 78pp

The report describes an evaluation of experimental voice, teletype and facsimile communications between an inland waterways towing vessel on the Mississippi River and its home office through NASA's ATS—3 satellite using VHF requencies. The experiment concluded that such communications are technically feasible but lacked conclusive data to demonstrate economic benefit.

NTIS

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054385
ELECTRONIC DOCKING SYSTEM—LITERATURE AND VENDOR DATA SURVEY

Carleton, H

National Maritime Research Center, Kings Point, New York 11024

Engineering Report, NMRC KP—116, Dec 1973, 23pp

The use of instrumentation as an aid in the docking of ships began in the early 1960's, and with the advent of very large ships, it soon became apparent that more than "eyeball" methods were required to dock ships quickly and safely. In response to this need for docking instrumentation, programs were initiated to develop the required instrumentation. As a result of these programs, several systems have been developed which are presently in use. Most of these docking systems have been installed on VLCC's of 100,000 DWT and larger. Other systems have been installed on docks, thereby requiring no shipboard installation. Company brochures and periodical literature have been issued in which these systems are described and discussed. This literature will be reviewed in this report, and includes: closed circuit television sytems, sonar systems, hybrid systems——pulse doppler and inertial, and a radio frequency system——CW doppler radar. A summary of these various systems is also given, with the system name, number and location of units installed, characteristics of each system, and remarks about each system, giving the principle and range of operation of the units, included in the paper.

NTIS

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057219
MARITIME SATELLITE NAVIGATION/COMMUNICATION PROGRAM. VOLUME I. EXECUTIVE SUMMARY

AII Systems, Moorestown, New Jersey 08057

Final Report, AII—MAR594—R—023—1, 7106—7310, Nov 1973, 49pp

Volume I provides in summary form a description of the design and operational features of the experimental Maritime Satellite Communication and Navigation (MARSCAN) System. The MARSCAN system consists of (1) a Maritime Coordination Center (MCC) located at the National Maritime Research Center (NMRC), Kings Point, New York, (2) Earth stations for communicating with the two satellites used in the system, (3) the NASA ATS—5 and ATS—3 synchronous equatorial satellites providing C—band transponders for relaying RF signals, (4) the ship terminals located on U.S. merchant ships plying the Atlantic and Pacific Oceans and (5) user terminals linked with the MCC through data phone land lines. This system provided the means for conducting communication and navigation experiments in an operational environment. This volume also summarizes the results of engineering and user—oriented experiments performed during the program.

NTIS

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071718
INLAND WATERWAYS COMMUNICATIONS STUDY. VOLUME I. EXECUTIVE SUMMARY

ARINC Research Corporation, 2551 Riva Road, Annapolis, Maryland 21401

Final Report, 0639—01—1—1295, Vol—1, 7307—7403, March 1974, 20pp

The report presents the results of a study of the communications requirements of the companies operating on the inland waterways, encompassing the Mississippi, Illinois, Ohio, Tennessee, Warrior and Missouri rivers and a portion of the Inter—coastal Waterway. Industry communications requirements are presented in detail, leading to the development of several alternative system concepts for an integrated Inland Waterways Communications System. A detailed evaluation of the hypothesized alternatives is presented and the preferred system concept is recommended. The implementation characteristics of the preferred system concept are described, as are the type of organization required to operate the system and the regulatory environment in which the system will operate.

NTIS

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084844
MARITIME SATELLITE BASELINE SYSTEM CONCEPT STUDY

Shoushanian, G

Magnavox Company, Advanced Systems Analysis Office, Silver Spring, Maryland

Final Report, ASRO—PR20051—1, March 1974, 183pp

A baseline maritime satellite communication system was selected from a number of candidate systems based on minimum cost to the user. These candidate systems were formulated from the results of analyses of the various techniques required to implement a satellite communication system (i.e., access control, multiple access, and modulation). The formulation of the candidate systems was based on the best application of compatible techniques for the most technical system concepts.

NTIS

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097757
STATE OF THE ART DOCUMENTATION—NUCLEAR MERCHANT SHIP COLLISION STUDIES

Anderson, AL

National Maritime Research Center, Galveston, Texas 77550

Technical Report, NMRC—274—44020—R2, Dec 1974, 70pp

This report presents a state—of—the—art survey of nuclear ship collision study programs. Some of the more important developments in collision barrier design that have taken place during the past two decades are discussed. These include statistical studies, analytical research, and experimental investigations.

Maritime Administration

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134611
IMPROVING U.S. SHIPPING PRODUCTIVITY. TECHNOLOGY: NAVIGATION AND COMMUNICATION

Fiore, AE

National Maritime Research Center, Kings Point, New York 11024

Final Report, NMRC—KP—125, June 1975, 214pp

The study investigates the innovations in communication and navigation that ship owners will be required to adopt for more effective means of operation to compete successfully in the shipping business. The report analyzes the use of satellites in providing accurate communication and global navigation, anti—collision radar data computer systems, and the general purpose shipboard computer as an aid in the operation of the new faster and larger ships. The study explores the possibilities for increasing ship productivity and provides conclusions and recommendations for further consideration.

NTIS

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138355
MARITIME COMMUNICATIONS FOR 1980s

National Maritime Research Center, Kings Point, New York 11024

MA—RD—930—76037, Nov 1975, 183pp

The Maritime Administration, Office of Commercial Development, has over the four year period (1971—1974) supported advanced communications and navigation projects to improve productivity of U.S. flag vessels. Projects include: Automated VHF FM Radio Telephone (Great Lakes and IWS); Satellite Communications and Navigation; Fleet Management Enhancement by Improved Communications and Navigation. This workshop presented status and results of these efforts. The workshop participants included responsible representatives from shipping companies, communications carriers, government, and others in the maritime community.

NTIS

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138356
ATS—6 MARITIME SATELLITE EXPERIMENTS (TECHNICAL SECTION)

Kaminsky, Y

Mitre Corporation, McLean, Virginia 22101

MA/RD—76038 113pp

Since 1969, the Maritime Administration (MARAD) of the U.S. Department of Commerce has been engaged in the evaluation of technological advances in satellite communications and electronic data processing in order to improve the competitive position of the U.S. Flag Fleet by improving the performance of the shipping process and associated logistics together with a reduction in costs of manual operations. This effort is being accomplished through a four—phase study and test program using the capabilities of existing satellites. During the twelve—month period between June 1974 and May 1975, MARAD conducted the third phase of this program using NASA's ATS—6 and ATS—5 satellites. The report describes briefly the system confiquration, summarizes the test activities, and presents the preliminary test results for the MARAD Phase III Program.

NTIS

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166707
PROCEEDINGS CAORF SYMPOSIUM (1ST), HELD ON JUNE 23—24, 1977

Maritime Administration, Washington, DC 20230

MA—RD—900—77094, June 1977, 119pp

Contents: An experimental investigation on collision avoidance system benefits; Collision avoidance behavior and uncertainty; Implementation of a CAORF experiment; Configuration of the CAORF system and data base for an experiment; CAORF validation of ship and scene; Validation of mate behavior on CAORF; Human collision avoidance behavior and uncertainty as a function of visibility, traffic density and navigational aids; A quick look at the value of transponder systems in collision avoidance; A review of Valdez experiment; Situation difficulty.

NTIS

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170046
CONDUCTING A MARINE RADAR TRANSPONDER EXPERIMENT AND STUDY. PHASE II

Sperry Rand Corporation, Marine Systems Division, Charlottesville, Virginia 22901

Final Report, 7311—7405, May 1974, 64pp

A study was made to determine means for radar target identification, enhancement, and display and/or utilization by vessels having a cooperative radar and beacon system. Experiments used cooperating shore and ship radar and beacon systems. Interrogation and reply codes and information format for system use are considered, together with PRR, clock rates, A.G.C., and radar power radiated in determining system range and utility.

NTIS

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172377
FEASIBILITY STUDY OF AN INTERNATIONAL DATA COMMUNICATIONS SYSTEM FOR THE U.S. MERCHANT SHIPPING INDUSTRY

Kolb, W

ARINC Research Corporation, 2551 Riva Road, Annapolis, Maryland 21401

1320—01—1—1563, Dec 1976, 112pp

This report describes the U.S. flag merchant shipping industry's present data communications costs and requirements. It develops alternative data communication systems concepts to meet these requirements, analyzes domestic and foreign regulatory constraints, selects a preferred system concept, and develops a prototype system implementation plan.

Maritime Administration

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199301
MARITIME SATELLITE NAVIGATION/COMMUNICATION PROGRAM: VOLUME III

Allied Information Industries, Moorestown, New Jersey

Experimental Results, MA—RD—900—74032, Nov 15, 1973, 194pp

Volume III provides a description of the experimental results achieved during testing of the experimental Maritime Satellite Communication and Navigation (MARSCAN) system. The experiment period extended from March 1973 to August 1973, during which both engineering and user—oriented tests were performed. The MARSCAN system consists of (1) a Maritime Coordination Center (MCC) located at the National Maritime Research Center (NMRC), Kings Point, New York, (2) Earth stations for communicating with the two satellites used in the system, (3) the NASA ATS—5 and ATS—3 synchronous equatorial satellites providing C—band transponders for relaying RF signals; (4) the ship terminals located on U.S. merchant ships plying the Atlantic and Pacific Oceans and (5) user terminals linked with the MCC through data phone land lines. This system provided the means for conducting communication and navigation experiments in an operational environment.

NTIS
Maritime Administration

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199303
MARITIME SATELLITE NAVIGATION/COMMUNICATION PROGRAM: VOLUME II

Allied Information Industries, Moorestown, New Jersey

Experimental System Description, MA—RD—900—74022, Nov 1973, 247pp

Volume II provides a description of the design and operational features of the experimental Maritime Satellite Communication and Navigation (MARSCAN) system. The system consists of (1) a Maritime Coordination Center (MCC) located at the National Maritime Research Center (NMRC), Kings Point, New York, (2) Earth stations for communicating with the two satellites used in the system, (3) the NASA ATS—5 and ATS—3 synchronous equatorial satellites providing C—band transponders for relaying RF signals, (4) the ship terminals located on U.S. merchant ships plying the Atlantic and Pacific Oceans and (5) user terminals linked with the MCC through data phone land lines. This system provided the means for conducting communication and navigation experiments in an operations environment.

NTIS
Maritime Administration

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199314
SPERRY CAS COLLISION AVOIDANCE SYSTEM

Uhlin, RC

Exxon International Incorporated, New York, New York 10019

Final Report, MA—RD—920—75049, Dec 1974, 13pp

This report covers the evaluation of the Sperry collision avoidance system aboard the EXXON BATON ROUGE during a test period of six months. A description of the system and a brief outline of the unique data presentation is also provided and the operation, ease of use and reliability is assessed. Performance and operational features have been rated and compared with several other systems previously evaluated and the report confirms this system gives a high level of information in tracking up to 20 targets.

NTIS
Maritime Administration

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199353
RADIO DETERMINATION

Radio Technical Commission for Marine Services, Washington, DC 20554

Final Report, CM—107—77/DO—99, Apr 18—21 1977, 110pp

Papers presented at this symposium were: "What's The Use of SC—65", "The Marine Radar Interrogator—Transponder", "The Marine Radar — The Clutter Problem", "What the Courts Say and Have Said About The Use of Radar", "Improved Perimeter Collision Avoidance System", "Nav—Lines — Keeping in Safe Waters with Digiplot", "Satellite Navigation, Now an Economical Choice for Maritime Vessels".

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number CM—107—77/DO—99.

199354
SHORT DISTANCE COMMUNICATIONS FOR COMMERCIAL AND RECREATIONAL VESSELS

Radio Technical Commission for Marine Services, Washington, DC 20554

Final Report, CM—106—77/DO—98, Apr 1977, 96pp

The following papers were delivered: "River Communications — Present and Future", "Necessary Improvements to the NHF—FM System", "The Bell System Approach to the Ecology of Spectrum", "What in the World is a Radio Council?", "The New Great Lakes Lakes—Wide All—VHF Automated Marine Telephone System", "Problems on the 2—3 MHz Marine Communication Channels Simplicity is the Key to Success at Sea", "Coastal Service in the Pacific Northwest", "Let's Not Turn Back the Clock on 2182 kHz."

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number CM—106—77/DO—98.

199355
NEW DEVELOPMENTS IN MARITIME ELECTRONICS SYSTEMS

Radio Technical Commission for Marine Services, Washington, DC 20554

Symposium Papers Vol. 2, CM—105—77/DO—97, Apr 18—21, 1977, 109pp

A collection of papers is presented which includes: "Error Correcting System for Single Channel Radio Transmission (ARQ)", "Application of a Satellite Aided Search and Rescue to the Marine Environment", "Management and Enforcement in the 200 Mile Fishery Conservation Zone", "NAVSTAR Global Positioning System", "An Inexpensive Synchronous Communication Satellite Terminal", "Worldwide Use of MARISAT", "WARC 1979 Preparation".

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number CM—105—77/DO—97.

199356
LONG DISTANCE COMMUNICATIONS FOR VESSELS AND OFFSHORE STRUCTURES

Radio Technical Commission for Marine Services, Washington, DC, 20554

Symposium Papers Vol. I, CM—104—77/DO—96, Apr 1977, 80pp

The following papers are presented: "Maritex—Automated Maritime Telex on HF", "Data Buoy Communications Experiences: HF vs. UHF", "Coast Guard Communications Station Portsmouth Hub for Atlantic Area Communications", "Single—Sideband on 2182 — To Be or Not To Be?", "Future Development of Maritime Long Distance Communications", "Maritime Satellite Requirements and Utilization."

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number CM—104—77/DO—96.

199370
MARINE TEST AND EVALUATION PLAN, S.O.W. 3.3.1, MARINE RADAR TRANSPONDER EXPERIMENTAL AND STUDY PROGRAM, PHASE IIA

Sperry Marine Systems, Incorporated, Great Neck, New York

Final Report, JA—220—3364, Feb 1976, 60pp

The purpose of this test program was final acceptance by MARAD of the results of a "Marine Radar Transponder Experiment and Study, Phase IIA". Included are three experimental Marine Radar Interogator—Transponders (MRIT) modified and their operation as a secondary radar system when integrated with the three different Sperry radars.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number JA—220—3364.

199371
INTERIM REPORT OF BENCH TESTS AT CONRACTOR'S FACILITIES, MARINE RADAR TRANSPONDER EXPERIMENTAL AND STUDY PROGRAM, PHASE IIA

Sperry Marine Systems, Incorporated, Great Neck, New York

Final Report, JA—220—3339, Mar 12, 1976, 106pp

Bench tests of three modified MRITs were performed. Engineering tests were run which established that the MRITs were operating normally and that installation was proper. In addition, tests were run to establish the Bit Error Rates as a threshold voltage and RMS noise. Data were also taken for determination of False Alarm Rate.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number JA—220—3339.

199372
TEST PLAN, CONTRACTOR'S FACILITIES, S.O.W. 3.2.1, MARINE RADAR TRANSPONDER EXPERIMENTAL AND STUDY PROGRAM, PHASE IIA

Sperry Marine Systems, Incorporated, Great Neck, New York

Final Report, JA—220—3338, Nov 26, 1975, 20pp

Two types of field tests were performed as bases for factory acceptance by MARAD of the equipment resulting from a Marine Radar Transponder Experiment and Study, Phase IIA.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number JA—220—3338.

199374
GREAT LAKES PROTOTYPE AUTOMATED VHF RADIOTELEPHONE SYSTEM

Lorain Electronics Corporation, Lorain, Ohio 44052

Final Report, MA—RD—900—73031

This report describes the prototype or experimental system of the Great Lakes Lakes—Wide All—VHF Automated Radiotelephone System which was developed and partially established. Public telephone service is provided to and from ships on the Great Lakes. The Prototype is a mini—system of six unattended all—VHF shore stations covering the most critical navigational areas of the Great Lakes. The System must serve non—automated as well as automated ships, and provide all services offered by the land telephone system. In addition, the Prototype provides monitoring of Channel 16, the distress channel, to detect and respond to possible calls by ships in distress.

Maritime Administration

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199385
REMOTE RADAR TRANSMISSION, PROCESSING AND DISPLAY: VOLUME II: EQUIPMENT AND TEST RESULTS

Applied Information Industries, Moorestown, New Jersey

Final Report, MA—RD—900—74023, Nov 15, 1973, 345pp

An experimental model of a Remote Radar Signal Transmission, Processing and Display System was designed and installed on a test vessel at the National Maritime Research Center, Kings Point, New

York. The system includes a commercial shipborne radar and a Radar Processor designed under this program. The processor performs a number of target limiting functions to reduce radar acquired target data to the minimum necessary for performance of a collision threat analysis. These data are then transmitted, via a simulated L-band satellite link, to a shore control center where the threat analysis is made and an escape maneuver is computed and transmitted back to the ship. Tests show that this approach to collision avoidance is feasible and that a system capable of providing such collision avoidance service to several thousand ships could be implemented using only one narrow band satellite link.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA-RD-900-74023.

199398
THE PROTOTYPE SYSTEM TO DEMONSTRATE A GREAT LAKES LAKES-WIDE AUTOMATED VHF MARINE RADIOTELEPHONE SYSTEM

Lorain Electronics Corporation, Lorain, Ohio 44052

Final Report, L-6-P, May 1, 1974, 31pp

The continually reducing traffic volume for the Great Lakes MF/HF/VHF Radiotelephone Service has become sufficiently critical to warrant investigation of a possible more efficient, cost-effective system. Avoidance of the costly MF/HF replacement became the principal incentive for serious consideration by the shipping companies of a centrally-operated all-VHF System. A prototype system development was started in July, 1973. Three key concepts provide economic practicality: 1) automation, 2) direct connection of each shore station with a nearby telephone central office, and 3) centralization of operator service.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L-6-P.

199399
MARAD PROTOTYPE SYSTEM FOR GREAT LAKES ALL-VHF CONCEPT

Lorain Electronics Corporation, Lorain, Ohio 44052

Specification Report, L-6-S, Nov 1975, 147pp

This report provides specifications for the MARAD Prototype for the Lakes-Wide All-VHF System concept. Successful implementation requires new handling and maintenance procedures, as well as complex control equipment. The Prototype System incorporates automation, "manual" calls where needed, and offers the complete range of voice and nonvoice services.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L-6-S.

199414
MARINE RADAR TRANSPONDER EXPERIMENTAL AND STUDY PROGRAM, CONTRACTOR'S FACILITIES, S.O.W. 3.2.4: PHASE IIA

Sperry Rand Corporation, Marine Systems Division, Charlottesville, Virginia 22901

Bench and Field Tests Report, S-65-M, Apr 31, 1976, 97pp

Bench and field tests of three modified Radar Interrogator Transponders (MRITs) were performed at Sperry Rand Marine Systems to provide the basis for factory acceptance by MARAD of the equipment resulting from a "Marine Radar Transponder Experiment and Study, Phase IIA". Included are both bench test raw data for determination of Bit Error Rate (BER) and False Alarm Rate (FAR), and all field test raw data, as well as raw data from the basic engineering bench tests. Overall, the tests were successful and demonstrated the practical use of the MRIT in its different modes of operation.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S-65-M.

199418
AUTOMATED MARITIME VHF COMMUNICATIONS SYSTEMS

Fee, JJ

Mitre Corporation, McLean, Virginia 22101

Final Report, M-76-11, Mar 1976, 22pp

Automated VHF communication for maritime utilization is considered in the context of two systems, one undergoing tests in the Great Lakes region, the other proposed for the inland waterways of the United States. The capabilities of such a system and the implications for improved maritime operations are developed in terms of the system elements and operational functions. Initial results of the Great Lakes prototype system are presented.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number M-76-11.

199419
EVALUATION OF THE TRANSIM LOW-COST SATELLITE NAVIGATION SYSTEM

Denzler, DW

Applied Physics Laboratory, Johns Hopkins Road, Laurel, Maryland 20810

Final Report, MA—RD—900—7402— May 1973— 267pp

This report discusses the joint Applied Physics Laboratory/Maritime Administration evaluation of the TRANSIM Low-Cost Satellite Navigation System. This work was sponsored by the Maritime Administration Office of Research and Development, Department of Commerce. The evaluation was conducted for approximately nine months. During this period the system was installed on three different ships: The R.V. Nereid, S/S Eric K. Holzer and S/S African Meteor. During each test phase the equipment was operated solely by ship's personnel after initial training. The major aspects of the system that were evaluated are: operability, accuracy, availability and applicability. Reliability, economic factors, and the impact of future development of the Navy Navigation Satellite System are also discussed. The Appendices include a short system description and several reports written by ship's personnel. All indications are that the system was successful in all aspects evaluated and with essentially no modifications could be produced and used to meet the high seas navigation requirements through the 1980s, and beyond.

NTIS

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, AD—755—149 — Volume I, AD—755—150 — Appendix.

199455
MARITIME DIGITAL SELECTIVE CALLING SYSTEM TECHNICAL DESCRIPTION

DeHaas, T Fee, JJ Feigleson, HA

Mitre Corporation, McLean, Virginia 22101

Final Report, MTR—7217, May 1976, 118pp

This document provides a detailed functional and technical description for the Maritime Digital SELective CALLing System (SELCALL) which is being developed to improve the capability for timely, reliable communication at sea. The SELCALL unit utilizes a digital message (Audio Frequency Shift Keying) with error checks and time diversity in conjuntion with conventional marine radio communications equipment to achieve this goal. Documents presenting the current CCIR position on the SELCALL and some of the results achieved with experimental units are included as Appendices.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MTR—7217.

199460
STUDY OF A RADIO DETERMINATION CAPABILITY, INMARSAT: VOLUME II

Computer Sciences Corporation, 6565 Arlington Blvd, Falls Church, Virginia 22046

Final Report, MA—RD—930—78027, Sept 1976, 216pp

The study considered the advantages of implementing a radio determination capability for first generation INMARSAT, developed alternative concepts for this capability, evaluated implementation costs for these alternatives, and provided recommendations for viable methods of implementation.

NTIS
Maritime Administration

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199462
STUDY OF A RADIO DETERMINATION CAPABILITY, INMARSAT: VOLUME I

Computer Sciences Corporation, 6565 Arlington Blvd, Falls Church, Virginia 22046

Executive Summary, MA—RD—930—78026, Sept 1976, 216pp

The study considered the advantages of implementing a radio determination capability for first generation INMARSAT, developed alternative concepts for this capability, evaluated implementation costs for these alternatives, and provided recommendations for viable methods of implementation.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, PB—276—966.

199464
FACSIMILE EVALUATION FOR MARITIME APPLICATION

Carraway, J

Magnavox Company, Advanced Systems Analysis Office, Silver Spring, Maryland

Final Report, ASAO—PR20061—2, March 1975, 27pp

This report (1) identifies cost—effective roles that the facsimile can play in satisfying maritime communications requirements, (2) reports the results of a cost comparison between facsimile and teletype for use in vessel communications, (3) analyzes the trend of future technological developments in facsimile, (4) develops cost forecasts for future facsimile communications, and (5) presents a table of currently available facsimile devices compiled from a survey of commercial manufacturers.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number ASAO—PR20061—2.

199475
ECONOMIC ANALYSIS OF MARITIME SATELLITE COMMUNICATIONS: POTENTIAL IMPACTS ON THE U.S. MERCHANT FLEET

Marine Management Systems, Incorporated, 300 Broad Street, Stamford, Connecticut 06901

Final Report, MMS—3—E, Dec 5, 1975, 105pp

This report addresses marine satellite communications costs through an examination of current marine transportation costs of U.S. merchant ships similar to the ones that are participating in the marine satellite tests.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MMS—3—E.

199480
SHIP CASUALTY ANALYSIS

Minorsky, VU

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, MA—RD—920—76048, Nov 20, 1975, 260pp

127 monthly casualty return sheets 1964—1974 from the Liverpool Underwriters Association were analyzed for ships over 2,000 gross tons. Casualties were studied world wide, with special interest in casualties deriving from collisions, and more specifically for three proposed nuclear ship routes. It was found that collisions and groundings remained constant for this period while world fleet increased. In the period there were 831 ships in collision, 850 groundings and 477 fires. The data collected for nuclear ship routes were used in a report on probability of collisions on selected routes, 5516—5.

NTIS

Maritime Administration

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199500
SOIS FINAL REPORT

Computer Sciences Corporation, 6565 Arlington Blvd, Falls Church, Virginia 22046

Executive Summary, C—65—SOIS—Vol.I

The long—range objective of the Shipping Operations Information System (SOIS) Project is to enhance the competitive posture of U.S. flag carriers by using recent advances in computer and telecommunications technology.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number C—65—SOIS—Vol.I.

199502
SHIP COLLISION STUDY: PRESENT SITUATION SURVEY

Minorsky, VU

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, MA—RD—920—76047, Nov 21, 1975, 86pp

Collision research since the SAVANNAH is briefly reviewed. A bibliography of 74 papers is given in four categories: Research, statistics and probabilities, avoidance, and miscellaneous. Of these, 14 were translated and 34 abstracted, the abstracts being included in the report.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, PB—254—750.

199525
MARITIME MOBILE DIGITAL SELECTIVE—CALLING REPORT ON EQUIPMENT DEVELOPMENT

Kimpo, FL Turner, EL Kump, CG

GTE Sylvania Incorporated, Electronic Systems Division, Mountain View, California 94040

Final Report, G—1232, May 1976, 49pp

This report provides a description of the SELCALL equipment and its development and testing and addresses specific benefits available.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number G—1232.

199529
FINAL REPORT FOR MARAD PHASE III TESTING PROGRAM

Magnavox Government and Industrial Electronics Company, Advanced Products Division, Torrance, California 90503

R—5184, Nov 1975

This document is the final report of the MARAD Phase III Engineering Support which had the following objectives: 1) Evaluate a digital telephone technique with the potential for use in operational systems, 2) Provide telephone service on one ship participating in the Phase III tests to carry out Fleet Management tests, coordinate experimental operations, and evaluate potential for crew personnel use of public correspondence telephone, 3) Provide the capability to experiment with data speeds in the 1200—1900 bps range, and 4) Evaluate and develop experimental plans for economical facsimile service to and from ships.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number R—5184.

199540
TEST & EVALUATION REPORT OF THE PHASE III ANTENNA SYSTEM

Magnavox Government and Industrial Electronics Company, Advanced Products Division, Torrance, California 90503

R—5394, May 26, 1976, 28pp

This report provides a test and evaluation of the shipboard antenna system originally developed for MARAD in Phase II of the Maritime Satellite Program and subsequestly modified for operation in Phase III. The purpose of this activity is to assess the feasibility of employing these systems during the Phase IV shipboard experiments which will utilize the MARISAT communications satellite system. The criteria include both technical and cost factors.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number R—5394.

199541
BRIEF COVERING REPORT DESCRIBING THE MX 330 MODEM

Magnavox Government and Industrial Electronics Company, Advanced Products Division, Torrance, California 90503

R—5186, Nov 1975

This report provides a brief description of the MX 330 voice/data modem. Two of these equipments were provided to MARAD under lease agreement, for its use in Phase III of the Maritime Satellite Program. One modem was installed as a part of a shipboard satellite terminal, the second unit has operated at the Maritime Coordination Center at Kings Point, New York. The experiments were conducted at L—band frequencies employing the NASA operated ATS—6 satellite.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number R—5186.

199543
ATS—6 SATELLITE L—BAND SYSTEM: PHASE III

Marine Management Systems, Incorporated, 300 Broad Street, Stamford, Connecticut 06901

Summary Report, MMS–3–ATS, Aug 1975, 29pp

The objectives of the program were to determine how satellite communications, and all their implications of real time data communications and processing, can be exploited to benefit the U.S. Flag Fleet economically and to improve ship safety.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MMS–3–ATS.

199549
LABORATORY TEST REPORT FOR MARITIME MOBILE DIGITAL SELECTIVE CALLING UNITS

GTE Sylvania Incorporated, Electronic Systems Division, Mountain View, California 94040

Final Report, G–75–LTR, Aug 1973, 9pp

The SELCALL units were laboratory tested to verify that the design specifications have been met. A report of the test results are provided as an Appendix A to this report.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number G–75–LTR.

199550
NARROW–BAND DIRECT PRINTING RADIOTELEGRAPHY: A STATE–OF–THE–ART SURVEY

Wells, PI

U. S. Department of Commerce, Office of Telecommunications, Institute for Telecommunication Sciences, Boulder, Colorado

Survey Report, OTR74–48, Oct 1974, 41pp

This report is a survey of the state–of–the–art of direct printing radiotelegraphy techniques which are applicable to the maritime mobile radiotelegraphy service. First, the current status of the maritime mobile radiotelegraphy service is assessed. Then the available direct printing radiotelegraphy technology is assessed. The technology surveyed included radio equipment, telegraphy, terminal equipment and error control techniques.

NTIS
Maritime Administration

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199552
MARITIME MOBILE TELEPRINTER ERROR–CORRECTION EQUIPMENT SPECIFICATION

GTE Sylvania Incorporated, Electronic Systems Division, Mountain View, California 94040

Final Report, E–245, June 1976

This document describes the teleprinter error–correction equipment developed for the U.S. Maritime Administration. This error–correction unit is part of the SELCALL/Error–Correction Teleprinting System which provides digital selective calling and protected teleprinter capability. This document is intended to provide the basis for a general procurement specification. Its use for that purpose is limited by two considerations. First, the equipment meets requirements defined by the International Radio Consultative Committee (CCIR) which were available when the development started. Since then, a revised CCIR recommendation 476 has appeared which is provided in Appendix A. This new recommendation as well as future revisions may affect the equipment significantly. A second aspect of the equipment described herein is that as a result of the testing of this equipment, some improvements are suggested in Appendix B which, if implemented, may modify the equipment described. The main body of this specification consists of a functional description of the unit, a discussion of technical characteristics, and a description of the software program.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number E–245.

199557
OPERATIONAL TEST REPORT FOR MARITIME MOBILE DIGITAL SELECTIVE CALLING UNITS

GTE Sylvania Incorporated, Electronic Systems Division, Mountain View, California 94040

Final Report, G–75–0, Sept 1973, 44pp

This is the final report of the GTE Sylvania SELCALL operational tests conducted in the Atlantic and Pacific areas during the period May 29 through July 26, 1973. In addition to the test results, this report contains: 1) a chronological narrative of the main events during the test program, 2) a discussion of the limitations of test procedures and instrumentation, 3) recommendations for equipment changes to meet specific operational requirements, and 4) test data summaries with a discussion of the method used for evaluation.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number G–75–0.

199558
MARITIME MOBILE DIGITAL SELECTIVE CALLING

GTE Sylvania Incorporated, Electronic Systems Division, Mountain View, California 94040

Equipment Specification Report, G–75–MM, Dec 1975

This document is a detailed specification of the selective calling device referred to by the generic term, SELCALL. The main body of this specification consists of a functional description of the unit, a detailed block description, a list of technical requirements, and a description of the SELCALL software program.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number G–75–MM.

199559
MARITIME MOBILE DIGITAL SELECTIVE CALLING: EQUIPMENT DEVELOPMENT AND OPERATIONAL TEST

Johnson, E Kump, CG Turner, E

GTE Sylvania Incorporated, Electronic Systems Division, Mountain View, California 94040

Final Report, G—75—M, Jan 1974, 129pp

The objective of the selective calling program is to ensure an adequate selective calling system is made available to the U.S. Flag Fleet at the earliest time. The Maritime Administration utilized a program with the following elements: 1) development of a technical specification for a digital selective calling system, 2) contract development and fabrication of a number of representative test equipments, 3) testing on ships at sea, 4) testing on a high frequency simulator, 5) submission of system proposals, and 6) implementation of the system.

NTIS
Maritime Administration

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199569
REMOTE RADAR TRANSMISSION, PROCESSING AND DISPLAY: VOLUME I

AII Systems, Moorestown, New Jersey 08057

Executive Summary, MA—RD—900—74033, Nov 15, 1973

This project established that radar video signals can be processed onboard ship to a TTY—rate bit stream and relayed to a remote center where collision avoidance calculations are performed. The relay link handles a composite signal of simultaneous radar data, ranging data, digital data, and voice—integrated and automatically controlled by the shoreshide computer. The meaning of this demonstration is that a single narrow band channel can provide all communications, navigation, and collision avoidance services through a single piece of shipboard equipment.

NTIS
Maritime Administration

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199585
MARITIME SONAR SYSTEM: CONCEPT FEASIBILITY

Peterson, D Kirklin, RH Martin, EW

Tracor, Incorporated, Sciences and Systems Division, Rockville, Maryland

Final Report, MA—RD—930—77068, Apr 1977

This is the final report of Phase 1A, Concept Feasibility, of the Maritime Sonar System (MSS) Program. The objective of the MSS Program is the development of a sonar system to give timely warning of hazards caused by underwater obstacles. The objective of Phase 1A is to assure the practicality of the design concept, prior to the commitment of funds for system specification, construction, and testing. The shallow—water environment was modeled and possible sonar system configurations were optimized with respect to that environment. A conceptual hardware system was developed to ensure technical feasibility of the system model. Also included are benefit—cost analyses, operational analyses, and alternate design concepts, recommendations for Phase 1B, Design and Test, are outlined.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—77068

199586
ATS—6 MARITIME SATELLITE TESTS

Kaminsky, Y

Mitre Corporation, McLean, Virginia 22101

Interim Report, N—75—A, May 1974 — Dec 1974

This document describes the ongoing Maritime Administration technical and fleet management experiments that have been conducted during the last eight months of 1974 using NASA's ATS—6 satellite. Section 1 of the report provides a short synopsis of the nature of the experiments — voice and data communications, ship position location, and electromagnetic compatibility of various shipboard terminals in the technical area, and type of information exchanged between the ships and the company offices in the fleet management area. Section 2 delineates equipment installation schedules, subsystem tests, system acceptance tests, post—launch check—out tests, and fleet management experiment preparatory activities. In Section 3 the progress made in the conduct of the planned tests and hours expanded in each area are summarized. Section 4 presents preliminary test results and Section 5 tabulates major problem areas encountered and actions taken to correct them. Comments concerning the success and conduct of the tests and reactions of the shipping company participants are outlined in Section 6.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number N—75—A.

199590
AN AUTOMATED STANDARDIZED BRIDGE DESIGN FOR THE U.S. MERCHANT MARINE: VOLUME I

Bertsche, WR Pesch, AJ

Eclectech Associates, Incorporated, North Stonington, Connecticut 06359

Executive Sumary, ET—3—A, Sept 15, 1976, 44pp

The report is an executive summary of Phase I of a MARAD sponsored study devoted to the development of a Standardized Bridge. An initial objective was to establish the relative advantages of bridges equipped with automated collision avoidance displays (CAS) over traditionally equipped bridges in order to determine the worth of their incorporation in a standardized design. At—sea data were collected on a balanced sample of ships equipped wtih CAS and those traditionally equipped. Results showed a doubling of: safe passing distances (1 NM versus 1/2 NM); threat detection ranges (7 NM versus 4 NM); and range at maneuver (4 1/2 NM versus 2 NM); all in favor of the CAS systems. Decreased workloads were also found, allowing more time for decision making. Design data were developed for a Standardized Bridge based on additional at—sea data. These data suggest a central console design for a single seated or standing deck officer with options for dual officer manning. Required advanced development of navigation displays was documented for inclusion in the standardized design.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number ET—3—A.

199631
THE FEASIBILITY OF A NATIONAL VESSEL TRAFFIC INFORMATION SYSTEM

Mitchell, MW

ARINC Research Corporation, 2551 Riva Road, Annapolis, Maryland 21401

Final Report, May 1978, 101pp

The study provides an overview of work performed by the Marine Exchange of the San Francisco Bay Region and ARINC Research Corp. to determine the feasibility of establishing a National Vessel Traffic Information System (NAVTIS). It provides a base for determining if present fragmented methods for reporting anticipated and actual vessel movements into and out of the nation's ports can be expanded from today's port—centered systems to a nationally integrated system of vessel—movement reporting. The considerations leading toward the recommended national system are summarized and the technical alternatives that were considered are described. The expected costs and revenues of the preferred National Vessel Traffic Information System at each stage of the recommended implementation process are provided. The report also describes the administration and management activities to be undertaken.

NTIS
Maritime Administration

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199637
MARITIME SATELLITE COMMUNICATIONS — A MANAGEMENT PERSPECTIVE

Penrose, WH

Computer Sciences Corporation, 6565 Arlington Blvd, Falls Church, Virginia 22046

Final Report, Aug 1978, 67pp

This report summarizes the results of a study of the "long—run" costs and benefits of maritime satellite communications. A portion of a continuing program of the U.S. Maritime Administration to improve the effectiveness of marine communications, the study reviews the efforts of participating U.S. flag shipping companies in using this new technology to solve some pressing problems of fleet management. Certain technical, operating and economic aspects of maritime satellite and HF (sitor/selcall) radio communications are also discussed to assist ship operators in obtaining the information needed to develop a management perspective for corporate decision making in reference to these new communications services.

NTIS
Maritime Administration

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047619
RESEARCH PROSPECTUS FOR MARINE POLLUTION CONTROL IN THE GREAT LAKES

A. T. Kearney, Incorporated, Chicago, Illinois

MA—RD—900—73—009, Aug 1972, 209pp

The prospectus reviews and summarizes the present status of the marine pollution problems on the Great Lakes and their relation to the merchant ships operating thereon, including municipal laws, state laws, and EPA implementation of the Water Quality Act of 1970 and other Federal legislation, and Canadian legislation. The prospectus recommends research in certain areas and outlines the projects needed for soliciting requests for proposals.

NTIS
Maritime Administration

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047750
PROPOSED SHORE FACILITY FOR TREATMENT AND DISPOSAL OF SHIP GENERATED OILY WASTES

Maritime Administration, Washington, DC 20230

ELR—73—0949 June 15, 1973, 61pp

The Maritime Administration proposes to lease to the Virginia Port Authority a surplus U.S. Navy complex, known as Cheatham Annex, located in York County, Virginia, for use as a facility for processing oily wastes from ships' tanks, bilges and ballast operations. The proposed project is expected to provide a beneficial impact by providing a facility where such oily wastes can be collected and treated prior to discharge into the York River. The project will increase barge traffic on the York River, oily odors in the vicinity will be created, solid wastes must be disposed of, and it is possible that oil spills will occur.

Maritime Administration

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050843
PORT COLLECTION AND SEPARATION FACILITIES FOR OILY WASTES. VOLUME I: COLLECTION, TREATMENT AND DISPOSAL OF OIL WATER WASTES FROM SHIPS

Forster, RL Moyer, JE Firstman, SI

Frederic R. Harris, Incorporated, New York, New York 10017

Final Report, March 1973, 236pp

The types of oil wastes brought into selected ports by non—military shipping are identified. Estimates of quantities, based on total prohibition of overboard dumping, brought in during 1970 and anticipated for 1975 and 1980 are made. Conceptual designs for collecting, treating and disposing of the oil wastes with no additional environmental degradation along with cost estimates were made for the selected ports. The roles of government are explored, the impact on shipping is evaluated and the overall entrepreneurial viability of the concept discussed. It is intended that this report serve as a guide for any U.S. port contemplating a port collection and separation facility.

NTIS

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053924
PORT COLLECTION AND SEPARATION FACILITIES FOR OILY WASTES. VOLUME 5. A COMPARATIVE ANALYSIS OF CONCEPTUAL SYSTEM PLANS FOR THE SURVEYED PORTS UNDER THE 'NO DISCHARGE' '1969 AMENDMENTS' AND 'NO SHEEN' CRITERIA

Forster, RL Moyer, JE Papacosta, CG

Frederic R. Harris, Incorporated, New York, New York 10017

Final Report, 7306—7308, Aug 1973, 470pp

The types of oil wastes brought into selected ports by non—military shipping are identified. Estimates of quantities, based on total prohibition of overboard dumping, the 1969 Amendments to the 1954 IMCO Convention and the no sheen criteria, anticipated for 1975 and 1980 are made. Conceptual designs for collecting, treating and disposing of the oil wastes with no additional environmental degradation along with cost estimates were made for the selected ports. The roles of government are explored, the impact on shipping is evaluated and the overall entrepreneurial viability of the concept discussed. It is intended that this report serve as a guide for any U.S. port contemplating a port collection and separation facility.

NTIS

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054111
STATE OF THE ART REVIEW OF OIL CONTAINMENT BARRIERS FOR USE AT OFFSHORE TERMINALS

Mainville, CR

Ocean Science and Engineering, Incorporated, Rockville, Maryland 20852

Nov 1973, 89pp

A review of information on oil barriers suitable for use offshore has been conducted. The technical literature, data from manufacturers and interviews with cognizant personnel at research, test and evaluation agencies, all through June, 1973, have been reviewed. Environmental conditions under which oil containment barriers at offshore oil terminals will be expected to operate effectively have been determined. The problem of oil containment has been studied and a body of performance expectations——conditions under which it is realistically expected that barriers will operate satisfactorily——has been developed. Commercially available barriers have been evaluated and barriers representing four distinct types of oil containment systems selected for a detailed analysis of the problems associated with each type. It is concluded that there is no commercially available oil containment barrier system which can by itself prevent the spread of oil under offshore conditions. Recommendations for further study to maximize the effectiveness of oil containment barriers at offshore terminals have been formulated. (Modified author abstract)

NTIS

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084838
SHIPBOARD SEWAGE REGULATIONS AND DISPOSAL METHODS

Chance, MJ

National Maritime Research Center, Galveston, Texas 77550

Technical Report, NMRC—272—20100—R2, 1974, 59pp

The report is intended as a reference to inform the shipping industry of the effects of sewage discharges, the regulatory requirements and available means of sewage pollution abatement. The first section provides a description of the effects of sewage discharge. The results of adequately treated and inadequately treated sewage discharges are described. The second section includes a discussion on federal standards and state regulations governing sewage discharges from watercraft. Major emphasis of this section is placed on federal standards promulgated by the Environmental Protection Agency. The last section describes the types of sewage treatment systems which are available for shipboard use. The descriptions include schematics and discussions of advantages and disadvantages of each available type system. Techniques and processes include holding tanks, biological oxidation, physical—chemical treatment, electro—chemical treatment, vacuum flush, recirculation, evaporation, incineration, and wet—air oxidation.

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084867
STUDY OF A MARINE SANITATION SYSTEM OPERATING ON SALINE WATER

Arkison, OJ Graves, RE

Moody College of Marine Sciences, Coastal Zone Laboratory, Galveston, Texas

Technical Report, May 1974, 50pp

The research studies the effectiveness of a biological sewage treatment system using either fresh water or salt water for flush water. The study began during the spring semester of the 1973 year while the ship was being used as a dormitory and continued during the 1973 summer cruise. The system was characterized by measuring temperature, BOD5, salinity, residual chlorine, pH, phosphate, nitrate, total suspended matter, and the coliform bacteria.

NTIS

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090746
INVESTIGATION OF TANKER SLOP TANK DESIGN

Fiocco, RJ Lanotte, VX Raffaelli, G

Exxon International Incorporated, New York, New York 10019

Final Report, Nov 1974, EE.23TMR—74, 7304—7407, Nov 1974, 64p

This report presents the results of an investigation of slop tank designs as related to use aboard ship as gravity separators for oily water. Based on both laboratory tests and tanker experience, design considerations and guidelines on inlet configurations, outlets, tank structure, system design, and waste water handling were developed to promote oil—water separation and reduce oil discharge to sea. The design and operating criteria can be applied to existing oil tankers and to new tankers.

NTIS

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091857
DEVELOPMENT OF A BATCHWISE IN—SITU REGENERATION TYPE SEPARATOR TO REMOVE OIL FROM OIL—WATER SUSPENSIONS

Fruman, DH

HYDRONAUTICS, Incorporated, Pindell School Road, Laurel, Maryland 20810

Final Report, TR—7080—3, Dec 1974, 117pp

The report documents the design test and evaluation of a 600 gpm oil—water separator for ballast water treatment. The basis of the particular separation concept used in this development program resides in the use of a very thick, open reticulated, oleophilic foam which is capable of separating the dispersed oil phase from the aqueous continuous phase independently of the oil density and which is amenable to regeneration by simple expression. The tests of the oil—water separation at the Navy Fuel Reclamation Plant are described. The performance of the separator in relation to the test conditions at this particular site are analyzed. Also, the mechanical operation of the system, the reliability and maintainability of the different components, as well as the general behavior of the filter media after successive filtration and regeneration, are assessed.

NTIS

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095119
STACK GAS EMISSIONS FROM OCEANGOING SHIPS: REGULATIONS, SIGNIFICANCE, AND CONTROL METHODS.

Linnstaedter, EE

National Maritime Research Center, Galveston, Texas 77550

Technical Report, July 1974, 61pp

Regulations applicable throughout the U.S. for ship stack gas emissions and comparable shoreside emissions were reviewed. No Federal regulations for ship stack gas emissions exist at this time. However, many state and local regulations are being imposed on the shipping industry. The significance of the stack gas problem was examined by reviewing the types of ships and fuel used, the types of emissions of concern, the overall contribution of pollutants by oceangoing ships, and the contribution of vessels in a port area. Control methods for the various air pollutants, including automatic combustion control systems, are discussed.

NTIS

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095120
STACK GAS EMISSIONS FROM OCEANGOING SHIPS: A DIFFUSION STUDY FOR THE PORT OF GALVESTON

Linnstaedter, EE Mitchell, GE

National Maritime Research Center, Galveston, Texas 77550

Technical Report, July 1974, 58pp

A mathematical diffusion study was performed for the port of Galveston to determine the effect of ship stack gas emissions on ambient air quality. The Gaussian distribution equation, the Holland stack rise equation, the EPA Air Quality Display Model (modified), and input data from actual and theoretical conditions were used in the study. The results of the study are isopleths for particulate, carbon monoxide, sulfur dioxide, Nitrogen Oxides (NOx), and hydrocarbon emissions. Additionally, data are provided on the maximum ground level concentrations of each of the above pollutants. A comparison of these data with Federal Ambient Air Quality Standards shows that sulfur dioxide emissions from the use of 2.5% sulfur in the fuel slightly exceed the secondary standard.

NTIS

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126040
A REVIEW OF OIL HANDLING PROBLEMS AT OFFSHORE TERMINALS. PART II. PROGRAM FOR EXPERIMENTALLY EVALUATING ADVANCED OIL BARRIERS

Schneider, IL Asher, RC Mainville, CR

Ocean Science and Engineering, Incorporated, Rockville, Maryland 20852

NMRC—272—23100—R1a 171pp

This report presents the results of a study on the performance and operational requirements for an oil barrier to be used at several possible deep water port sites. Four types of barriers were investigated as follows: (1) pneumatic barrier (2) skirt barrier, raisable, (3) skirt barrier, fixed flotation, and (4) skirt/pneumatic barrier (hybrid type). An engineering review of the four barrier designs is conducted and a program for their experimental evaluation is developed. The evaluation program provides for three levels of tests over a 3—year period: Containment/removal concept tests, dynamic model and component tests and offshore tests of a prototype barrier.

NTIS

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126369
MEASUREMENT AND INTERPRETATION OF NONVOLATILE HYDROCARBONS IN THE OCEAN. PART I. MEASUREMENTS IN ATLANTIC, MEDITERRANEAN, GULF OF MEXICO, AND PERSIAN GULF

Brown, RA Searl, TD Elliott, JJ Monaghan, PH Brandon, DE

Exxon Research and Engineering Company, Linden, New Jersey 07036

MA—RD—900—75009, 221pp

Little quantitative data are available on the amount and composition of hydrocarbons in the sea. To obtain such data, water samples were taken from tankers along four main routes in the Atlantic and adjacent seas and in other locations from oceanographic research vessels. Floating oil or tar balls were not collected. The water samples were extracted with carbon tetrachloride. The amount of extractable organic material and the amount and composition of nonvolatile hydrocarbons were measured. Hydrocarbons (with a mean of 4 ppb) were log—normally distributed in the samples collected through the top two meters of the water column. In deeper ocean waters hydrocarbon content generally declined with depth, and the median value was less than 1 ppb. Based on relative amounts of hydrocarbons and of total CCL4 extractable material, it is estimated that the hydrocarbons are mostly petroleum—derived in locations where petroleum input into the sea is likely. Additional work is needed to confirm and extend these findings.

NTIS

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126373
PORT COLLECTION AND SEPARATION FACILITIES FOR OILY WASTES. VOLUME VI. IMPACT OF OFFSHORE TERMINALS ON CONTIGUOUS PORTS

Forster, RL Moyer, JE Lepeau, M

Frederic R. Harris, Incorporated, New York, New York 10017

MA—GEN—970—75067, 7309—7501, March 1975, 89pp

The impact of the energy crisis, embargoes and environmental concerns of transportation of crude oil and petroleum products to potential offshore receiving terminals is ascertained. As the proposed refinery construction programs are directly related to offshore terminal construction, the import of the various refinery construction programs on offshore terminals and the movement of produce by product tankers is also analyzed. The various ports on the three coasts are analyzed with respect to sizes of tankers that may be accommodated and a vessel mix is developed. From this mix and the forecast petroleum demand, tanker movement requirements are estimated. These estimates are used to develop four arrival matrices for 1980 and for 1985——for PAD I and PAD III. Three arrival matrices are developed for PAD V over the same period. From these matrices based on assumed enforcement of the 1973 IMCO Convention, the quantities of oily wastes likely to arrive at given ports on the three seacoasts are estimated.

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138547
FLOCCULANT USE ON TANKERS

Shewmaker, JE

Exxon Research and Engineering Company, Florham Park, New Jersey 07932

MA—RD—940—76035, 50pp

This report presents the results of shipboard studies of flocculants to improve oil—water separation in tanker slop tanks. Experiments were performed in matched pairs of slop tanks. Montmorillonite clay in fresh water and a clay activator were mixed into the slop waters at levels of 100 mg/kg (ppm) and 20mg/kg (ppm), respectively. Flocculation improved the oil—water separation at a very rapid rate. After the best method of application, flocculant—treated slop water contained about 20—50 mg/kg (ppm) of oil compared to several hundred mg/kg (ppm) in the control tank undergoing unaided gravity separation. Since flocculation would require supplying and handling of additional materials as well as operational effort, other methods of achieving oil—water separation may be preferred. Unanswered questions concerning flocculant use include the fate and effects of the clay and the economic recoverability of flocculated oil.

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141621
CHARACTERIZATION OF PRODUCT TANKER SLOP WATERS

Shewmaker, JE

Exxon Research and Engineering Company, Florham Park, New Jersey 07932

MA—RD—930—76054, 55pp

The pollutional characteristics of product tanker slop and bilge waters have been determined to provide basic data for planning shorebased reception and treatment facilities for the wastewaters. The vessels selected for these studies had on their previous voyage carried a product transported in large volume by tanker. Products covered included various gasolines, diesel fuels, heating oils, fuel oils, kerosene and

aromatic naphthas and solvents. The tanker wastewaters were analyzed for total oil, COD, BOD5, TOC, TOD, suspended solids, phenols, sulfides, ammonia and pH. Oil was found to be the principal contaminant, COD, BOD5, TOC, TOD and suspended solids were often present at levels indicating the necessity of treatment to meet common regulatory limits for shore-side effluents. The concentrations of phenols and sulfides were pollutionally significant in a few cases. Ammonia and pH were found to present no pollution treat generally in tanker wastewaters. The contaminants in tanker wastewaters could be handled in existing testing processes at most locations.

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141622
TANKER SLUDGE REMOVAL AND DISPOSAL

Lanotte, W Shewmaker, JE

Exxon International Incorporated, New York, New York 10019

MA-RD-940-76055, 51pp

This report covers the varied aspects of the problem of cargo tank sludge on crude carriers. It starts with a general description of the problem and scans the sludge management alternatives in selecting a strategy. Crude washing is briefly discussed as a combined removal and disposal technique. In-tank removal methods involving portable eductors and a vacuum cleaner arrangement are described and conclusions are drawn from test results. Current and potential shore disposal methods are presented including sludge farming, incineration (also shipboard), oil extraction, chemical fixation, and aqueous extraction.

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159254
IMPROVED MARINE BOILER RELIABILITY. PHASE II. VOLUME IV. STACK GAS ANALYSIS

Combustion Engineering, Incorporated, Marine Power Systems, Windsor, Connecticut 06095

Final Report, MA-RD-920-77019, Feb 1977, 48pp

This report presents the results of shipboard testing of a modern marine boiler for stack gas constituents related to corrosion and air quality. Special instrumentation and gas sampling equipment was used to obtain stack gas concentrations of oxygen, carbon monoxide, sulfur dioxide, sulfur trioxide, water vapor, and nitrogen oxides. Tests were performed at six boiler load ratings ranging from 11% to 110% over a wide range of excess air levels. Results obtained serve to characterize the conversion of SO2 to SO3 for the test boiler and permit the calculation of sulfuric acid dew point, demonstrating the dependence of dew point temperature on excess air level and boiler load. Nitrogen oxides were recorded over the complete test range (including an in-port condition) to establish a relationship between stack emissions, boiler load, and excess air for the boiler under test.

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170054
LEAK DETECTION IN UNDERWATER OIL PIPELINES

Jackson, P

National Maritime Research Center, Galveston, Texas 77550

NMRC-272-23100-R2, Sept 1973, 41pp

The findings of a brief state-of-the-art review of leak detection devices suitable for underwater oil pipelines is discussed. The review includes consideration of leak or crack detection by flow measurement, pressure, ultrasonics, acoustic emission, magnetic flux, visual examination, eddy current, radioactive slugs, electromechanical and electrochemical tapes, doublewalled pipes, coaxial cable, lasers, permeable membranes, and remote sensing. The review was performed to provide appropriate pollution control information prior to the construction of underwater oil pipelines from deep water tanker terminals to shore facilities. It was recommended that a stationary ultrasonic through-the-pipe-wall crack/flow detector be used with a coaxial cable and shroud positioned a short distance above the pipe.

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199305
TANKER TANK CLEANING RESEARCH PROGRAM

Cooper, WJ

MSA Research Corporation, Evans City, Pennsylvania

Final Report Phase 1, MA-RD-900-74017, March 11, 1974, 474pp

This report presents the findings of an 18 month evaluation of crude oil tankship tank cleaning and related operations. Data from industry surveys, shipboard studies and laboratory investigations were used to provide a state-of-the-art review and to develop recommendations/guidelines that will increase the safety of tank cleaning operations, reduce the oil pollution of the oceans and reduce the cost and effort involved in tank cleaning. Major report sections review and evaluate equipment and operational procedures employed in tank washing, slop separation and handling, and tank atmosphere control. Specific findings emphasize the importance of training of tanker operations personnel. Guidelines for improved training programs are provided, as well as recommendations for further research and development.

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Maritime Administration

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199323
BAILEY OIL CONTENT MONITOR

Moreau, JO

Exxon Research and Engineering Company, Florham Park, New Jersey 07932

Final Report. MA-RD-930-75068, June 1975, 60pp

Previous laboratory and shipboard tests have shown that the Bailey Oil Content Monitor (BOCM) could function as a trend indicator to monitor changes in oil concentration in the ballast water discharged to sea by a tanker. The objective of this current project was to work with Bailey to improve the quantitative accuracy of this device. This project effort concentrated on minimizing BOCM errors caused by improper calibration and by electronics signal drift. Bailey's current calibration procedure was shown to be inadequate and new calibration techniques were developed and tested aboard ship. The primary source of electronic signal drift was found to be the photomultiplier tube and ways to reduce the signal drift were evaluated. As a result of this project, techniques

were developed which will make it possible to substantially reduce some of the BOCM errors which have been observed. However, this report identified several other potential sources of BOCM error. The wide variety of potential error sources makes it doubtful whether the BOCM can be relied upon to be more than a trend indicator.

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199341
PORT COLLECTION AND SEPARATION FACILITIES FOR OILY WASTES: VOLUME IV

Forster, RL Moyer, JE Firstman, SI

Frederic R. Harris, Incorporated, New York, New York 10017

Executive Summary, MA—RD—900—73029, Mar 1973, 69pp

The types of oil wastes brought into selected ports by non—military shipping are identified. Estimates of quantities, based on total prohibition of over—board dumping, brought in during 1970 and anticipated for 1975 and 1980 are made. Conceptual designs for collecting, treating and disposing of the oil wastes with no additional environmental degradation along with cost estimates were made for the selected ports. The roles of Government are explored, the impact on shipping is evaluated and the overall entrepreneurial viability of the concept discussed. This volume contains the executive summary of the study.

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199342
PORT COLLECTION AND SEPARATION FACILITIES FOR OILY WASTES: VOLUME III: GENERAL DATA AND CONCEPTUAL PLANS FOR THE SURVEYED PORTS

Forster, RL Moyer, JE Firstman, SI

Frederic R. Harris, Incorporated, New York, New York 10017

Final Report, MA—RD—900—73028, Mar 1973, 454pp

At each port surveyed, local industry, facilities, methods of operation, plans for expansion, markets for recovered oil, local preferences, and local requirements for the discharge of treated water to streams, bays, or local sewage systems were studied. An inventory was made of oily waste collection, handling, and treatment facilities in existence, and oily waste loads projected for 1975 and 1980 based on anticipated vessel activity. Each port plan begins with a collection system. Several feasible collection methods were studied and the best one selected based on the estimated loads, local operation methods, preferences, and costs. Considering the local market for recovered oil and other criteria mentioned above, a preferred treatment and disposal system was selected and the profitability of the system analyzed for the nominal load, half this load, and twice the load. This volume gives the background data, estimated waste loads and the conceptual collection—treatment—oil recovery/disposal plan for each of the surveyed ports.

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199345
PORT COLLECTION AND SEPARATION FACILITIES FOR OILY WASTES: VOLUME II

Forster, RL Moyer, JE Firstman, SI

Frederic R. Harris, Incorporated, New York, New York 10017

General Technology Report, MA—RD—900—73027, Mar 1973, 168pp

The information in this volume provides technical background information on the technologies and processes which were investigated in the course of this study in order to develop the system plans for the survey ports. It also describes the procedures used to collect samples from vessels at the various ports, and the tests which were performed in analyzing them. Evaluation of the adequacy of the sampling procedure is discussed in a separate chapter, along with recommendations to be followed before any of the ports undertake the preparation of specific plans or designs. The final chapter reports on an overview summary of existing practices in some other countries in the handling of maritime oily wastes. Practices in Japan, the Netherlands, Italy, and Iran are covered in the summary.

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199387
ENVIRONMENTAL CONSIDERATIONS FOR SUBMARINE CRUDE OIL TANKERS

Lulejian & Associates, Incorporated, Falls Church, Virginia

Final Report, L—8—E, March 1973, 35pp

This effort addresses, in a collective manner, the environmental factors associated with a submarine crude oil tanker system. In the first part of the study, potential operating areas and the environment associated with them are identified. The second part of the study deals with the potential effects on the environment of operating a submarine crude oil tanker system. The physical behavior of oil under ice, possible methods of oil disposition, and areas of needed research are discussed.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number L—8—E.

199424
MARINE EQUIPMENT ENVIRONMENTAL SPECIFICATION STUDY: PHASE I

Raytheon Company, Portsmouth, Rhode Island

Final Report, NMRC—KP—127, Dec 1974, 135pp

This study establishes the necessary background to permit an intelligent and logical approach to succeeding efforts aimed at developing a maritime environment specification that may be applied as a guideline for the development and test of reliable maritime equipment for future procurements. Domestic and international rule making and classification societies were contacted, maritime equipment manufacturers and shipowners/operators were sampled, and an extensive literature search was undertaken to establish existing practices.

Maritime Adminstration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—KP—127.

199426
GREAT LAKES AND SEAWAY: VOLUME IV: ENVIRONMENTAL CONSIDERATIONS

Woodward, JB

Department of Naval Architecture and Marine Engineering, University of Michigan, Ann Arbor, Michigan

Transport Analyses, MA—RD—930—75053, Nov 1974, 15pp

Some environmental considerations bearing on Great Lakes and seaway winter navigation are discussed. In particular, the objections to winter navigation that have been raised by environmental groups are treated, although only in cases where such objections are judged likely to have an effect on ship design or operation. The items discussed are hazards to ships that might have consequent environmental damage, the need to study possible impacts of increased navigational use of the Great Lakes, and questions of competition for federal investment between water and land transportation modes. Recommendations for further research by marine—oriented federal agencies are generated from the first of these.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—75053.

199432
TEST PLAN FOR THE SHORESIDE EVALUATION OF OIL/WATER SEPARATORS

Mitchell, GE

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—272—20200—R2, June 1974, 20pp

This test plan is intended as a guide for the development of test procedures for testing oil/water separators in the Maritime Administrations', NMRC—Galveston Oil/Water Separation Test Loop. Tests performed will be under controlled conditions, shoreside, which will simulate many of the conditions encountered onboard ships. Test media includes salt and fresh water, oil, chemicals, and solids. Oil/water separators selected for tests will be accomplished on the basis of their design. Separator certification and installation recommendations will be made on the basis of test results.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—272—20200—R2.

199436
CHARACTERIZATION OF BALLAST WATER

Shewmaker, JE Goodrich, RR Skocypec, RJ

Exxon Research and Engineering Company, Florham Park, New Jersey 07932

Final Report, EE—3TMR—74, Apr 1974, 87pp

This report summarizes ballast characterization studies to define the concentration levels of the following contaminants: oil, suspended solids, BOD5, COD, pH, ammonia, phenols and sulfides. Ballast water samples from nine tankers were taken and analyzed. The study included ballast following two crude oils and ten of the clean oil products carried in largest volume by tankers. Oil contents found in dirty ballast on clean oil product tankers were in the same range, but with a slightly higher median value, as those found on crude oil carriers. BOD, COD and suspended solids levels in dirty ballast were often comparable to, but were sometimes measurably greater than, those in the sea water taken on as ballast. The levels of phenol, sulfides, and ammonia found in dirty ballast were usually very low and near the minimum concentrations which could be detected by the analytical methods employed in the program.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number EE—3TMR—74.

199461
SHIP STACK GAS MONITORING: METHODS AND ANALYSIS PRINCIPLES

Ritter, ML

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—272—20200—R3, July 1975, 94pp

Regulatory efforts to curb air pollution and increases in fuel costs have provided new incentives to monitor stack gas emissions from ships. Monitoring methods and analysis measurement principles are discussed which can be used to determine ship stack gas emissions. Analyzers and sampling equipment associated with continuous extractive or in situ stack gas monitoring of stationary source emissions, such as from oil—fired steam generators, are most readily adapted to shipboard or maritime applications.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—272—20200—R3.

199470
TREATABILITY STUDY FOR THE MARAD OIL/WATER SEPARATION TEST INSTALLATION

Cimato, J Chance, MJ

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—272—20000—R3, Jan 1975, 63pp

This report describes the results of a study to determine the quality of influent and effluent seawater for the MARAD Oil/Water Separation Test Installation (MOSTI) at the National Maritime Research Center — Galveston, Texas (NMRC—G). Parameters of importance for the influent water include salinity or specific gravity, suspended solids, and total organics. Based on the desired water quality and acquisition considerations, the Galveston Ship Channel (GSC) was selected as the seawater source for the MOSTI. Other sources considered include the Gulf of Mexico, a ground well, and synthetic seawater. Effluent discharge criteria for oil, TOC, BOD5, COD and total suspended solids were established based on Public Law 92—500, 40 CFR Part 110 and 40 CFR Part 419. Results of laboratory tests on simulated effluent from the MOSTI indicate that both primary and secondary treatment will be necessary.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—272—20000—R3.

199509
THE APPLICATION OF LAND-BASED COMPUTERIZED SPECTROMETERS FOR EFFLUENT MONITORING ABOARD NUCLEAR POWERED SHIPS

Kamykowski, EA

National Maritime Research Center, Kings Point, New York & Bethpage, New York

Final Report, NMRC-KP-142, Dec 1975, 83pp

This report assesses the applicability of computer-based, Ge(Li) detector spectroscopy systems as effluent monitors aboard nuclear powered ships. A survey of the principal commercial spectrometers, in light of the expected shipboard use, indicates these systems may be employed for automatic radioisotope analysis in a seagoing environment if adequate protective measures are adopted.

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199520
MARAD OIL/WATER SEPARATOR TEST INSTALLATION (MOSTI)

National Maritime Research Center, Galveston, Texas 77550

Executive Summary, NMRC-273-30000-R1, June 18, 1974

This report finds that no installations exist which are capable of performing operational tests on candidate separation systems to adequately determine their effectiveness and reliability under rigidly controlled test conditions. Current practice is for manufacturers to test their own units. However, in this particular case the testing is inadequate, both in the product development stages as well as in performance verifications of individual units. Variables requiring accurate control are temperature, pressure, volume flow rate, fluid velocity, kind of oil, oil/water mixture ratio, and additives such as cleaning agents and rust and scale simulators. A shoreline installation designed for testing variables is recommended.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC-273-30000-R1.

199583
ENVIRONMENTAL SPECIFICATION INVESTIGATION, MARITIME ELECTRONIC SYSTEMS: PHASE 1

Donaldson, M Pepper, CS Mertz, R Bettum, R

American Export Lines, Incorporated, New York, New York

Final Report, MA-RD-930-7602, Sept 1975, 141pp

This report presents the results of an environmental parameter data acquisition investigation. Sensors and recording instrumentations were integrated and installed aboard a container ship, the C.V. EXPORT FREEDOM. Data were recorded during the voyage which occurred in December, 1974. The route included ports along the U.S. east coast, the North Atlantic, and the English Channel. The instrumentation test plan is presented along with the recorded data in raw and reduced form. Recommendations for follow-on tests include measurements on a selected sample of ships sailing typical trade routes and using a portable instrumentation package.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA-RD-930-7602.

199593
REQUIREMENTS FOR AN OIL/WATER SEPARATION TEST LOOP

Mitchell, GE

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC-272-20000-R1, July 1974, 61pp

This report presents a list of performance capabilities to be used for the design of an Oil/Water Separation Test Loop. The required performance capabilities are based on the results of a review of regulations, an investigation of shipboard operating practices, surveys of shipboard oily waste treatment systems, and existing facilities for testing oil waste treatment equipment. The Test Loop will enhance testing of oil/water separators, evaluating oil-in-water monitors with separators and wastes from LOT simulation, determining the effect of pumps on oil/water emulsions, evaluating concepts for treating water separated from oil, studying tank cleaning techniques and coatings, and testing oil/water interface systems.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC-272-20000-R1.

199594
NUCLEAR MERCHANT SHIP RADIOACTIVE WASTE MANAGEMENT

Cheung, KY

National Maritime Research Center, Galveston, Tesas 77550

Final Report, NMRC-272-24000-R2, Sept 1973

Estimates of radioactive waste release for a proposed 120,000 SHP commercial nuclear ship were obtained. The recommended radioactive waste discharge policies for future nuclear ships are based on both 10 CFR 20 and the proposed 10 CFR 50 (Appendix I) to limit the radioactive waste discharge to the environment as low as practicable.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC-272-24000-R2.

199626
APPLICABILITY OF SHORESIDE AIR QUALITY EMMISSION LAWS TO MERCHANT VESSELS IN PORT

Hansen, AG Baham, GJ Porricelli, JD

CHI Associates, Incorporated, 1011 Arlington Blvd., Arlington, Virginia 22209

Final Report, MA-RD-920-79055, July 1979

A review has been completed of the existing rules and regulations for seventeen port areas that apply to the broad classification of industrial power generating equipment to determine their potential impact on

the operation of a steam turbine propelled merchant vessel if the rules are expanded to include shipboard power plants. The analysis includes a treatise on shipboard combustion, a survey of port area emission regulations, the determination of the need for compliance standards, a compliance cost assessment, and the development of emission law variance methodologies. Even though ship emissions are considered insignificant by the study (see chart), recommendations are made as follows: 1) a nationwide variance from the local regulations and control of ship stack emissions should be developed, 2) an appropriate federal agency should be selected to regulate ship emissions, 3) an agency should, with international concurrence, develop national regulations for ship emission control that are consistent with both the actual need to reduce vessel emissions and the technical and economic constraints dictated by current marine boiler technology, and 4) until such time as a national variance is established, state-imposed restrictions on local ship emission control can be sought in areas where unreasonable regulations are being applied to ships.

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199645
A STUDY OF THE ECONOMICS AND ENVIRONMENTAL VIABILITY OF A U.S. FLAG TOXIC CHEMICAL INCINERATION SHIP: VOLUME I

Halebsky, M

Global Marine Development, Incorporated, P. O. Box 3010, Newport Beach, California 92630

Executive Summary, GMD-04068-002-Vol-1, Dec 1978, 39pp

This report details the economic and environmental viability of incinerating toxic chemical wastes at sea using a U.S. flag ship(s). The ocean incineration history in Europe and the United States is reviewed first. The impact of international, national, and state rules and regulations on waste quantities and ocean incineration are evaluated. Toxic waste quantities available for ocean incineration (primarily chlorinated and unchlorinated organics) are then estimated for 1977, 1983, and 1989 for the United States, Canada, Mexico, Brazil, Japan, and Western Europe. Capital cost, operating cost, and incineration cost per ton of waste are calculated for a U.S. flag ship and compared with incineration charges for a European ship and for land-based incineration. The conclusion is that a U.S. flag incineration ship(s) is economically and environmentally viable.

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199646
A STUDY OF THE ECONOMICS AND ENVIRONMENTAL VIABILITY OF A U.S. FLAG TOXIC CHEMICAL INCINERATION SHIP: VOLUME II

Halebsky, M

Global Marine Development, Incorporated, P. O. Box 3010, Newport Beach, California 92630

Final Report, GMD-04068-002-Vol-2, Dec 1978, 289pp

This report details the economic and environmental viability of incinerating toxic chemical wastes at sea using a U.S. flag ship(s). The ocean incineration history in Europe and the United States is reviewed first. The impact of international, national, and state rules and regulations on waste quantities and ocean incineration are evaluated. Toxic waste quantities available for ocean incineration (primarily chlorinated and unchlorinated organics) are then estimated for 1977, 1983, 1989 for the United States, Canada, Mexico, Brazil, Japan, and Western Europe. Capital cost, operating cost and incineration cost per ton of waste are calculated for a U.S. flag ship and compared with incineration charges for a European ship and for land-based incineration. The conclusion is that a U.S. flag incineration ship(s) is economically and environmentally viable.

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199647
A STUDY OF THE ECONOMICS AND ENVIRONMENTAL VIABILITY OF A U.S. FLAG TOXIC CHEMICAL INCINERATION SHIP: VOLUME III

Global Marine Development, Incorporated, P. O. Box 3010, Newport Beach, California 92630

Appendices, GMD-04068-002-Vol-3, Dec 1978, 102pp

This report details the economic and environmental viability of incinerating toxic chemical wastes at sea using a U.S. flag ship(s). The ocean incineration history in Europe and the United States is reviewed first. The impact of international, national, and state rules and regulations on waste quantities and ocean incineration are evaluated. Toxic waste quantities available for ocean incineration (primarily chlorinated and unchlorinated organics) are then estimated for 1977, 1983, and 1989 for the United States, Canada, Mexico, Brazil, Japan, and Western Europe. Capital cost, operating cost, and incineration cost per ton of waste are calculated for a U.S. flag ship and compared with incineration charges for a European ship and for land-based incineration. The conclusion is that a U.S. flag incineration ship(s) is economically and environmentally viable.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number GMD-04068-002-Vol-3.

199651
DISPOSAL OF VESSEL WASTES: SHIPBOARD AND SHORESIDE FACILITIES: PHASE I - BLACKWATER

Bartley, CB Leininger, EM Titcomb, AN

Environmental Research Group, Incorporated, 117 N. First Street, Ann Arbor, Michigan 48104

Final Report, MA-RD-930-79012, Feb 1979, 231pp

The existing technical solutions to blackwater waste disposal problems of Great Lakes commercial vessels were defined and documented by conducting a survey of ship and port operators. The problems, posed by winter conditions to the operation and performance of waste disposal facilities, were examined and analyzed for a projected winter navigation season. Shoreside disposal facilities were inventoried for number, type, limitations, winter weather problems and technical solutions to these problems. Shipboard facilities, marine sanitation devices, were evaluated for treatment performance and operation under general and winter conditions. The effects of blackwater treated by marine sanitation devices on the Great Lakes ecosystem were evaluated for short and long term impacts during an extended as well as normal navigation season. Various state and federal blackwater disposal regulations were discussed and the

economic effects of the regulations on ship operations were evaluated for each type of treatment, with special attention given to holding tank design and costs.

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035956
MANAGEMENT OF A SEAPORT

Schwimmer, MJ Amundsen, PA

National Maritime Research Center, Kings Point, New York 11024

Final Report, NMRC—KP—114, Dec 1973, 594pp

In the fall of 1971, the Maritime Administration contacted the Management Research Division of the National Maritime Research Center and asked us to develop a course and discipline concerning the Management of a Seaport. This manuscript is the foundation document for a course in scientific management of a modern seaport. The objective of the work is to provide the reader with a basic understanding of seaport systems, their development and operation, and their interrelationships with land and water carriers. It is designed to broaden the perspective and understanding of the vessel operator and to give visibility and extension to the range of career opportunities available in the broader spectrum of United States maritime industries. The authors believe that the reader will find this work to be the most comprehensive treatment of the port industry recently undertaken. The scope and applicability of the text has been broadened by including a series of practical problems in business administration, including law, economics, finance, management, accounting, marketing, planning, public relations, and personnel administration.

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043943
THE ECONOMICS OF DEEPWATER TERMINALS

Maritime Administration, Washington, DC 20230

1972, 60pp

This study of the economics of offshore terminal facilities, which would permit the use of 200 to 300,000 ton vessels in our important bulk trades, indicates that by 1980 the additional costs to this Nation of failing to provide the most economical form of deepwater terminal facility could exceed $650 million annually, in terms of increased domestic prices of imported iron ore and crude oil and lost competitiveness in the export—coal market. The study was concentrated in six areas to explore the problem, its causes, and solutions: 1. The impact of the present continuing upward trend in the size of bulk carriers, the economic considerations underlying it, and the port—development projects undertaken throughout the world to meet it. 2. The major constraints to the use of large bulk carriers in present U.S. North Atlantic ports. 3. The need for providing deepwater terminal facilities in this region and the economic penalties for failing to do so. 4. The obstacles preventing multiple channel deepening on the North Atlantic coast. 5. The economics of alternative transshipment facilities located in deepwater harbors and the open sea along the North Atlantic coast. 6. The impediments to offshore terminal development projects in this area. This study is not meant to be the last word on this subject. It was intended, however, to provide a useful, comprehensive focal point for further research and discussion, which hopefully will lead to firm plans to provide deepwater terminals for U.S. foreign trade in the near future.

Maritime Administration

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084462
REPORT ON RAIL AND MARINE INTERFACE AT THE PORT OF NEW ORLEANS

Maritime Administration, Washington, DC 20230

Sept 1974, 35pp

In describing and evaluating the rail/marine interface systems in the Port of New Orleans, this report focuses on the time, distance, and cost involved in container interchanges between the rail and marine terminals. In order to better visualize some of the interchange situations, a brief description of each rail and marine facility utilized by American operators is provided. Also included is a brief description of the Port of New Orleans and where necessary, area maps provide the proper context. This study points out those interfaces which are considered productive as well as those which are considered counter—productive. Such objectivity is considered essential if improvements are to be made by marine, rail, port, motor, and other shipping interests. It is the Maritime Administration's belief that through this type of cooperative effort the problems of rail/marine interfacing can be minimized, if not eliminated.

Maritime Administration

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098627
REPORT ON RAIL AND MARINE INTERFACE IN THE SAN FRANCISCO BAY AREA

Maritime Administration, Washington, DC 20230

Sept 1974, 25pp

This report examines in detail the factors influencing the transfer of intermodal equipment between rail terminals and U. S. flag carrier marine terminals in the San Francisco Bay Area. The objective is to provide an informational survey and analysis of the nature, procedures and problems of container interchange.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

130516
GREAT LAKES WINTER NAVIGATION: TECHNICAL AND ECONOMIC ANALYSES. ANNEX: METHODS OF EVALUATION AND COMPUTER PROGRAM

Swift, PM Elste, VH Stallone, BJ

Michigan University, Ann Arbor, Michigan 48104

MA—RD—930—75076, 7309—7412, Sept 1975, 53pp

This report is an annex to a previously published five volume set of reports dealing with Great Lakes winter navigation. Revisions and modifications to the computer program known as the Extended Season Program, or ESP, are summarized. This program is used for the prediction of the economic performance of Great Lakes bulk carriers operating in an extended season. The report describes additions and modifications to the methods of evaluating ship economics and operations during the winter on the Great Lakes and St. Lawrence River. The documentation of the computer program containing these revisions is also updated. Finally a series of examples illustrates the increased versatility of the computer program.

Maritime Administration

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130518
TRANSPORT ANALYSES: GREAT LAKES AND SEAWAY. VOL. I SUMMARY AND MISCELLANEOUS

Benford, H

Michigan University, Ann Arbor, Michigan 48104

MA—RD—930—75050, 7309—7412, Sept 1975, 45pp

This is the introductory volume to a five—volume series dealing with several aspects of commercial marine transport on the Great Lakes and St. Lawrence Seaway. This volume summarizes the principal points of the entire series and outlines probable future developments in related technologies. Topics include mine—to—blast furnace transport analysis, technical aspects of ship enlargement, optimization of fleet composition, methods for predicting times to transit ice covered waters and alternatives for devlivering material to mills on constricted rivers. Other topics relate to methods for better exploitation of the St. Lawrence Seaway: winter navigation, feeder service for general cargo, and enlargement of locks, among others.

Maritime Administration

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131096
REPORT ON RAIL AND MARINE INTERFACE AT THE PORT OF JACKSONVILLE

Maritime Administration, Washington, DC 20230

Aug 1975, 19pp

The Jacksonville study, as did its predecessors, focuses mainly on the intermodal operations of U. S. — flag steamship operators. All port rail and marine terminal facilities which handle intermodal equipment are discussed however, whether utilized by either U. S. or foreign flag ocean carriers.

Maritime Administration

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131603
INVESTIGATION OF A SUBMERGED WAVE ATTENUATION SYSTEM FOR OFFSHORE DEEP WATER OIL TERMINALS

FMC Corporation, San Jose, California 95108

Final Report, MA/RD—930—76032, Dec 1974, 156pp

Scale model tests, preliminary designs and cost estimates of a unique breakwater device were performed. Results, with respect to wave attenuation performance, future test requirements, prototype configuration and cost factors, are presented.

NTIS

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145846
PORT SYSTEM STUDY FOR THE PUBLIC PORTS OF WASHINGTON STATE AND PORTLAND, OREGON. VOLUME II. TECHNICAL SUPPLEMENT. PART 6. PORT CAPACITY ANALYSIS AND METHODOLOGY

Aerospace Corporation, Seattle, Washington

MA—GEN—970—7707, 233pp

The objectives of the capacity analysis are to develop up—to—date and coordinated data on cargo handling and storage capability of subregions in the study area, to identify facilities development needed to meet future demands, and to provide a practical tool for usefully evaluating capacities of existing facilities for forecasting future capacities of ports. The conclusions reached regarding the need for future facilities for the various cargo movements are based on existing and new facilities being operated at full capacity as defined herein. This study does not attempt to define when these facilities should be constructed or at what level of capacity the ports should be operated.

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145847
PORT SYSTEM STUDY FOR THE PUBLIC PORTS OF WASHINGTON STATE AND PORTLAND, OREGON. VOLUME II. TECHNICAL SUPPLEMENT. PART 5. MARINE—PORT TECHNOLOGY FORECASTS AND DEMAND ANALYSES

Nickels, FJ

Aerospace Corporation, Seattle, Washington

MA—GEN—970—7705, Vol—2—Pt—5, 129pp

Technological developments embodied in the ships engaged in trade with a particular region do not arise from local conditions but more in response to conditions existing on trade routes around the world. Exceptions are vessels primarily engaged in local coastwise or internal trades. Limitations of ports, volume of commerce, and certain commercial practices, such as maintenance of frequent schedules, will determine which ships in the world fleet will actually serve the region. The projected existence of more efficient ships in the world fleet that would not serve the region because of port limitations may be an incentive to such ports to remove restrictive limitations.

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145848
PORT SYSTEM STUDY FOR THE PUBLIC PORTS OF WASHINGTON STATE AND PORTLAND, OREGON. VOLUME II. TECHNICAL SUPPLEMENT. PART 4. PUGET SOUND AND LOWER COLUMBIA SUBREGION COMMODITY FORECASTS

Waters, RC

Aerospace Corporation, Seattle, Washington

MA—GEN—970—7705, Vol—2—Pt—4, 99pp

This Supplement presents forecasts of general cargo, grains and soybeans, dry bulk and liquid bulk commodity movements in foreign and domestic coastwise oceanborne trade. Also presented are the methodology, assumptions and rationale used to develop the forecasts. The commodity forecasts were developed with the aid of linear and logarithmic projections and analysis of past trends (1954 through 1973).

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145849
PORT SYSTEM STUDY FOR THE PUBLIC PORTS OF WASHINGTON STATE AND PORTLAND, OREGON. VOLUME II. TECHNICAL SUPPLEMENT. PART 3. FOREST PRODUCTS ANALYSIS

Aerospace Corporation, Seattle, Washington

MA–GEN–970–7704, 226pp

Forest products is a major industry in the Pacific Northwest and as such generates large volumes of cargo for the ports of the region. The principal commodities handled by some ports are almost entirely forest products, consisting principally of lumber, logs, and wood chips. The analysis of forest products is separated from the other commodities handled in domestic and foreign trade, and projections of their future movements estimated independently.

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145850
PORT SYSTEM STUDY FOR THE PUBLIC PORTS OF WASHINGTON STATE AND PORTLAND, OREGON. VOLUME II. TECHNICAL SUPPLEMENT. PART 2. PORT FACILITIES INVENTORY

Aerospace Corporation, Seattle, Washington

MA–GEN–970–7703, 264pp

This port facilities inventory is a comprehensive source of facility information describing the 12 public ports located in the state of Washington and the Port of Portland which are engaged in deep–water oceanborne commerce. A major objective of the inventory has been to provide a data base describing the physical characteristics of each of the deep–water cargo ports of interest in the study. This inventory includes a detailed description of deep–water cargo terminal facilities of public ports in the region, including a discussion of geographic, navigational, and transportation aspects of the waterborne commerce presently moving through the ports. The inventory presents facility data in narrative and tabular summary form. Maps are included showing the locations of principal facilities at each port.

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145851
PORT SYSTEM STUDY FOR THE PUBLIC PORTS OF WASHINGTON STATE AND PORTLAND, OREGON. VOLUME II. TECHNICAL SUPPLEMENT. PART 1. STUDY APPROACH, COMMODITY SPECIFICATIONS, TREND ANALYSIS, AND DOMESTIC TRADE ORIGIN AND DESTINATION DATA

Aerospace Corporation, Seattle, Washington

MA–GEN–970–7701, Vol–2, 157pp

Work in this study included obtaining public port physical, economic, and institutional data to assist in defining the current characteristics of the public port system. Commodity data gathered included foreign export/import commodity data, domestic coast wise receipts, and shipments data with forecasts made for the years 1980, 1990, and 2000. Forecasts also were made of marine and port technologies for the current and future time periods. Expert judgment was applied to assess impacts of potential future changes which cannot be determined from historical trends.

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145852
PORT SYSTEM STUDY FOR THE PUBLIC PORTS OF WASHINGTON STATE AND PORTLAND, OREGON. VOLUME I. EXECUTIVE SUMMARY

Aerospace Corporation, Seattle, Washington

MA–GEN–970–7701, Vol–1, 40pp

The Port System Study for the public ports of Washington State and Portland, Oregon examines the actions required to maintain a system of maritime ports capable of meeting the future requirements of foreign and domestic trade. The study forecasts waterborne commerce and changes in shipping and cargo handling technologies to the year 2000. The study then translates these anticipated changes into port facility needs and financial requirements over the same period. Finally the study recommends an organizational approach for coordinating future port developments, thereby ensuring the most effective use of public funds. The study is intended to serve as a comprehensive base for cooperative regional port planning and development activities.

NTIS

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145906
PORT REQUIREMENTS FOR THE SAN FRANCISCO BAY AREA. PHASE I. SUMMARY REPORT

Boerger, FC

Northern California Ports & Terminals Bureau, Incorporated, San Francisco, California

MA–RD–970–T76068, 53pp

Studies were undertaken to investigate the long–term needs for facilities to accommodate future international and domestic shipping in the San Francisco Bay area. These studies provide a basis for answering queries by environmentalists concerning the need for port expansion. They provide a tool to demonstrate a definite relationship between growth in commerce and the required expansion of port capabilities.

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158249
FEASIBILITY STUDY TO EVALUATE THE COMMERCIAL MARKET FOR A TETHERED FLOAT BREAKWATER SYSTEM

Moffatt and Nichols, Long Beach, California

Final Report, MA–RD–970–77077, March 1977, 182pp

The Tethered Float Breakwater is a system of portable components designed for use over limited periods in deep ocean or coastal environments to protect activities such as ship discharge, offshore construction, dredging, pipe laying or marina operation. The components are spherical floats up to about 5 ft diameter tethered in multiple rows to a sub–surface ballasted framework, anchored if in deep water or on the bottom if in shallow water. The report describes the concept, origin, objective, and proposes methods of deployment under various conditions. It estimates capital and operating costs for representative applications. The appendix includes design data as well as evaluation of a concept for holding the breakwater in position in deep water by use of multiple tugs. The report describes the economic potential under several conditions, but concludes that for deep water long fetch sites, the anchored system does not appear feasible; however, the self–positioning alternative is considered useful at such sites when the application is short and periodic movement is needed.

NTIS

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169614
A TECHNOLOGY ASSESSMENT OF OFFSHORE INDUSTRY. THE UNITED STATES OFFSHORE INDUSTRY. CURRENT STATUS, TRENDS AND FORECAST 1976–2000. VOLUME I

Durfee, JH

BDM Corporation, 7915 Jones Branch Drive, McLean, Virginia 22101

MA–RD–940–78002, 522pp

Volume I presents a description of the current status of the U.S. offshore industry together with developing trends in the industry and an examination of the various forces that influence development. A 25 year forecast of offshore industry development is included. Also included is a description of the U.S. commercial ocean fishing industry and a 25 year forecast of industry development.

NTIS

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169615
A TECHNOLOGY ASSESSMENT OF OFFSHORE INDUSTRY AND ITS IMPACT ON THE MARITIME INDUSTRY 1976–2000. VOLUME II

Durfee, JH

BDM Corporation, 7915 Jones Branch Drive, McLean, Virginia 22101

MA–RD–940–78003, 144pp

Volume II examines the various impacts on the traditional maritime industry of offshore industry development, and describes the areas of planning needed by the maritime industry to accommodate those impacts.

NTIS

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169616
A TECHNOLOGY ASSESSMENT OF OFFSHORE INDUSTRY AND ITS IMPACT ON THE MARITIME INDUSTRY 1976–2000. EXECUTIVE SUMMARY

Durfee, JH

BDM Corporation, 7915 Jones Branch Drive, McLean, Virginia 22101

MA–RD–940–78001, 74pp

This report contains a 25 year forecast of the offshore industry including offshore petroleum production, offshore power production, offshore mining, offshore service platforms, and commercial ocean fishing. Each segment of the offshore industry is described in terms of the current status of industry, trends that might influence the direction of future development, and forces acting on the industry to impede or encourage growth. The report examines potential areas of impact on the maritime industry, such as financial, manpower, environmental, materials requirements, legislation and regulation, and new technologies, that might result from offshore industry development. Further it discusses changes likely to result in the maritime industry from the various impacts described and suggests planning that will be needed to accommodate to the changes. The report provides a comprehensive analysis of the future of the offshore industry.

NTIS

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182502
LNG SINGLE POINT MOORING TERMINAL

Donaldson, GB, Jr

Donaldson Associates, Rancho Pales Verdes, California 90274

MA–RD–940–78057, June 1978, 89pp

This report describes an initial investigation on a proprietary Single Point Mooring (SPM) concept for Liquefied Natural Gas (LNG) and other low temperature fluids. The study included analytical evaluation of buoy and hose string motions, together with preliminary design and analysis of a coaxial LNG/vapor swivel, a self–sealing LNG disconnect, and a floating LNG hose assembly. Thermal and hydraulic analyses were also carried out for the seabed pipeline. All results were positive, and further investigation is recommended.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA–RD–940–78057.

199306
PRELIMINARY DESIGN REPORT: MINI–DRYDOCK FOR VERY LARGE CRUDE–CARRYING SHIPS

Corbett, PR

National Maritime Research Center, Galveston, Texas 77550

MA–RD–900–74062, May 1974, 34pp

This report presents a preliminary design of a mini–drydock which can be used for servicing very large crude–carriers (VLCC's). The mini–drydock would be especially useful in servicing VLCC's since the number of conventional drydocks large enough to service them is limited. To reduce time lost during standard drydocking, the concept of mini–drydocking, which would enable inspection and maintenance of underwater portions of the ship (while it is docked for loading and unloading), is being suggested as feasible.

NTIS
Maritime Administration

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199404
STUDY OF THE PORT OF METROPOLITAN ST. LOUIS: APPENDIX A: PROFILE OF THE PORT, 1975

A. T. Kearney, Incorporated, Chicago, Illinois

MA–RD–970–77024, May 1976, 285pp

Appendix A acts essentially as a data base to support the Final Study Report to the Maritime Administration and the Final Development Plan for the Port of Metropolitan St. Louis. This Appendix profiles the land features, transportation facilities, and utilities in the port area. It also summarizes the information gathered by interview, for the 105 dock facilities located in the Port. (Color illustrations reproduced in black and white.)

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199443
PORT OF METROPOLITAN SAINT LOUIS ATLAS

East—West Gateway Coordinating Council, St. Louis, Missouri

Final Report, MA—RD—970—77027, May 1976, 107pp

The report depicts the 105 port facilities, by dock type, ownership and location in the Metropolitan St. Louis area. Also illustrated on the maps are major highways, railroads, shipyards, fleeting areas, river and streams, levees, floodwalls and the estimated areas that are occasionally flooded. (Portions of this document are not fully legible.) (Color illustrations reproduced in black and white.)

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199445
STUDY OF THE PORT OF METROPOLITAN ST. LOUIS: APPENDIX C: PORT OPERATIONS ANALYSIS

East—West Gateway Coordinating Council, prepared by A. T. Kearney, Incorporated, St. Louis, Missouri & Chicago, Illinois

MA—RD—970—77026, May 1976, 92pp

The appendix presents an analysis of dock operations in the Port of Metropolitan St. Louis. The analysis covers 20 loading and unloading operations for the 13 major commodities presently handled in the Port of St. Louis. The appendix includes a brief description of several aspects of the total door to door shipment of each commodity, flow charts of loading and unloading of each commodity at the dock, cost analysis of the door to door shipments on a per ton basis. This analysis deals with the Port of Metropolitan St. Louis, although parallels could be drawn to other inland Port operations. (Color illustrations reproduced in black and white.)

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Maritime Administration

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199446
STUDY OF THE PORT OF METROPOLITAN ST. LOUIS: APPENDIX B: COMMODITY MARKET ANALYSIS

East—West Gateway Coordinating Council, prepared by A. T. Kearney, Incorporated, St. Louis, Missouri & Chicago, Illinois

MA—RD—970—77025, May 1976, 55pp

Appendix B presents a market analysis of commodities moving by waterborne tranportation in the St. Louis Bureau of Economic Analysis Region (BEAR 114). The analysis begins with a review of all commodity flows presently originating and terminating in the St. Louis BEAR along with all local extra—BEAR movements. A mechanical forecast then presents projected future waterborne trade traffic flows for the St. Louis BEAR to the year 2000. (Color illustrations reproduced in black and white.)

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199476
STUDY OF THE PORT OF METROPOLITAN ST. LOUIS: PHASE II—A: A PRIMER ON INLAND WATERWAYS PORTS

East—West Gateway Coordinating Council, prepared by A. T. Kearney, Incorporated, St. Louis, Missouri & Chicago, Illinois

Executive Summary, MA—RD—970—77022, Aug 1976, 33pp

The report summarizes an investigation of the operations of an inland marine port. Using the Port of Metropolitan St. Louis as a typical inland water port, the report profiles an inland port, addresses the water flow effects on dock construction and operations, investigates the efficiencies of inland marine terminals and discusses the impact of new marine transportation concepts on inland ports. This executive summary also offers recommendations to both industry and government for future research actions. (Color illustrations reproduced in black and white).

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199477
STUDY OF THE PORT OF METROPOLITAN ST. LOUIS: PHASE II—A: A PRIMER ON INLAND WATERWAYS PORTS

East—West Gateway Coordinating Council, prepared by A. T. Kearney, Incorporated, St. Louis, Missouri & Chicago, Illinois

Final Report. MA—RD—970—77023, Aug 1976, 208pp

The report presents the results of a study of inland marine port operations. It was performed for the United States Maritime Administration through the East—West Gateway Coordinating Council, which is the regional planning agency for the Metropolitan St. Louis Area. This text provides a reasonably comprehensive overview of an inland waterways port and should serve as a primer on the subject. Although the official purpose of the study was to identify water flow and other factors which affect inland port operations, the study provides the first reasonably thorough analysis of an inland waterways port as a part of the nation's transportation system. (Color illustrations reproduced in black and white.)

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199478
U.S. GREAT LAKES — SEAWAY PORT DEVELOPMENT AND SHIPPER CONFERENCE, DEARBORN, MICHIGAN, APRIL 25—29, 1976

A. T. Kearney, Incorporated, Chicago, Illinois

Final Report, MA—RD—970—77015, Aug 31, 1976, 179pp

The document reports the results of the U.S. Great Lakes—Seaway Port Development and Shipper Conference held in Dearborn, Mich. in April, 1976. The objective of the conference was to unite industry, labor and government efforts in the identification and solution of problems affecting the development of the U.S. Great Lakes Seaway port industry and the shipper community.

NTIS
Maritime Administration

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199481
METHODOLOGY FOR ESTIMATING CAPACITY OF MARINE TERMINALS: VOLUME II: NORCAL PORT CAPACITIES FOR ALAMEDA, BENICIA, OAKLAND, RICHMOND, AND SAN FRANCISCO

Northern California Ports & Terminals Bureau, Incorporated, prepared by Manalytics, Incorported, San Francisco, California

Final Report, MA—RD—970—T76070—Vol.II, Aug 1976, 13pp

The study presents a standardized method for estimating throughput capacity of marine terminals. Not only port authorities, but ocean carriers and large shippers have repeated use for a precise, accurate and efficient method for estimating the capacity of a given facility or for estimating the spatial and equipment requirements for a facility to handle a given throughput.

NTIS
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199482
METHODOLOGY FOR ESTIMATING CAPACITY OF MARINE TERMINALS: VOLUME I: STANDARDIZED METHODOLOGY

Northern California Ports & Terminals Bureau, Incorporated, prepared by Manalytics, Incorported, San Francisco, California

Final Report, MA—RD—970—T76070—Vol.I, Feb 1976, 234pp

The study presents a standardized method for estimating throughput capacity of marine terminals. Not only port authorities, but ocean carriers and large shippers have repeated use for a precise, accurate and efficient method for estimating the capacity of a given facility or for estimating the spatial and equipment requirements for a facility to handle a given throughput.

NTIS
Maritime Administration

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199487
CRITERIA AND REQUIREMENTS FOR PORT DEVELOPMENT AND OPERATIONS

Maritime Administration, Washington, DC 20230

Final Report, M—3—CAR, Sept 1977, 49pp

The report addresses five basic elements of port planning: port and terminal technology, investment criteria and strategies, port capacity, port pricing and port environmental assessment. The report offers the main characteristics of port planning as well as introducing some of the latest managerial techniques that have been adapted specifically for port development and decision—making.

Maritime Adminstration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number M—3—CAR.

199544
MARINE TERMINAL CONTROL SYSTEM (MTCS): VOLUME II

Computer Identics Corporation, Westwood, Massachusetts 02090

Preliminary Progress Report, C—63—M—Vol.II, 1975

This report is a detailed progress report on the marine terminal control system (MTCS), covering: program management, road scanners, data filter and I/O devices, AVI label assembly and installation, crane scanning system, applications package, systems integration, site preparation, site installation, system maintenance, system evaluation, and documentation.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number C—63—M—Vol.II.

199545
MARINE TERMINAL CONTROL SYSTEM (MTSC): VOLUME I

Computer Identics Corporation, Westwood, Massachusetts 02090

Executive Summary, C—63—M—Vol.I 1975, 25pp

This report concentrates upon operations in the marine terminal environment as appropriate within a program to improve all aspects of the operations of American flag carriers to make them more competitive in the world shipping market. The marine terminal control system aims to minimize the high transfer costs and customer delays that are inherent to container terminals.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number C—63—M—Vol.I.

199604
ECONOMIC IMPACT OF THE U.S. PORT INDUSTRY: AN INPUT OUTPUT ANALYSIS OF WATERBORNE TRANSPORTATION: VOLUME I

Olcott, ES Gilbert, J Sun, NC Ilan, A Hamsar, W

Port Authority of New York and New Jersey, Planning and Development Department, New York, New York

Aug 1978, 96pp

The objective of this study was to provide policy makers in government and business with a new tool by which the economic impact of alternative policies relating to the U.S. port industry can be analyzed and assessed. An input—output model was created showing in quantifiable terms how the port industry is economically linked with every other sector of the economy.

Maritime Administration

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199621
IMPROVED FENDER SYSTEMS FOR SHALLOW AND DEEP DRAFT BERTHS: PHASE I

Han, E Priori, G Juran, D

Dravo Van Houten, Incorporated, One Penn Plaza, New York, New York 10001

Final Report, MA—Gen—970—78046, June 1978, 218pp

This report presents investigations and descriptions of the following: (1) state—of—the—art of fender design (2) available fender units (3) comparison of fender unit performance (4) common system configurations (5) adequacy of systems' function (6) docking procedures (7) fender system costs (8) mooring practices (9) types of damage to fender systems (10) problems with fenders (11) maintenance and repair practices (12) examination of trends in ships' characteristics. The functions of various fender systems are described, and types of damage and problems that may occur are presented. Problems with fender systems are ranked, and design objectives are identified.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—GEN—970—78046.

199630
AUTOMATED MANAGEMENT CONTROL SYSTEM FOR PUBLIC MARINE TERMINALS: PHASE I: SYSTEM DEFINITION, SYSTEM ANALYSIS AND CONCEPT DESIGN

Miller, JT Greene, LB

ARINC Research Corporation, 2551 Riva Road, Annapolis, Maryland 21401

Final Report, Nov 1978

Major conclusions reached by this study are: 1) it is feasible to configure an automated system for controlling the flow of containerized cargo through a marine terminal, 2) an automated control system must provide central control of information flow, timely acquisition and transmission of data, storage of current status information, and access to data for a variety of uses, 3) preliminary cost—benefit analyses have shown an extremely favorable relationship between benefits and costs and an attractive rate of return on investment, 4) an automated terminal management control system can provide the basis for establishing electronic exchange of data with carriers, shippers, and various other agencies outside the marine terminal, and 5) a Phase II demonstration is justified.

NTIS
Maritime Administration

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168855
DESIGN OF TEST RIG FOR HYDRODYNAMICALLY COUPLED CONTRAROTATING PROPELLER PROPULSION SYSTEM

Folenta, DJ

Transmission Technology Company, Incorporated, 9 Commerce Road, Fairfield, New Jersey 07006

Final Report, MA—RD—920—77100, Aug 1977, 75pp

There appears to be universal agreement with respect to the improvements to be gained from the action of contrarotating propellers. From a machinery design point of view, various CR arrangements are feasible. This report discusses design of a model CR test rig using an epicyclic gear as the CR shaft output generator and a speed reducer. The report further discusses the options available to the propulsion systems designers and the implication of the various options on such parameters as mechanical efficiency, size, arrangement, etc. The introduction of the simple epicyclic gear as the CR shaft generator introduces the concept of hydrodynamically coupled CR propellers.

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168856
A STATISTICAL AND ECONOMIC EVALUATION OF STERN TUBE BEARING AND SEAL FAILURES

Arpi, DW Winn, LW

Mechanical Technology Incorporated, 968 Albany—Shaker Road, Latham, New York 12110

MTI—77TR58, 88pp

The report presents the findings of known studies of the incidence and nature of stern tube bearing and seal failure in large merchant vessels. The repair costs and lost vessel service time associated with these failures are documented for ships of various sizes and types. It is calculated that the present value of the repair costs and lost service time is close to $100 million, for ships having shafts larger than 500 mm in diameter which will be built between 1978 and 1990, unless research and development efforts are undertaken to improve stern tube bearings and seals. This cost does not include the cost of failures in ships already built that will be operating in the 1978—1990 time period.

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175077
DESIGN AND OPERATION OF STERN TUBE BEARINGS: AN ASSESSMENT OF THE STATE—OF—THE—ART

Pinkus, O

Mechanical Technology Incorporated, 968 Albany—Shaker Road, Latham, New York 12110

MTI—77TR61, 207pp

This report contains a critical survey of stern tube bearing design and operation, as practiced on merchant marine vessels. The emphasis is on the modern fleets of fast container ships and bulk carriers. Both oil and water lubrication are considered. The severity of the bearings' operating condition is described as well as the difficulties of present day designs to meet the requirements of stern tube operation. Recommendations are made for a program aimed at advancing the technology of stern tube bearings in order to meet the needs of present—day and future ships.

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199313
HIGHLY—SKEWED PROPELLER RESEARCH PROGRAM: SAN CLEMENTE ORE/BULK/OIL(OBO) CARRIERS: PART II

National Steel and Shipbuilding Company, San Diego, California

Final Report, MA—RD—930—75012, Nov 1974, 379pp

Comparative performance evaluations of a conventional and a highly—skewed propeller are documented and analyzed in terms of full scale trial results and also with model experiments and predicted calculations. Part II is comprised of the analysis of the test data, display of final results in graphic and other forms, discussions and conclusions and description of test setups, photographs and test conditions.

NTIS
Maritime Administration

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199454
BEARING AND SEAL MATERIALS FOR STERN TUBE APPLICATIONS — ASSESSMENT OF THE STATE—OF—THE—ART

Murray, SF Smith, WV

Mechanical Technology Incorporated, 968 Albany—Shaker Road, Latham, New York 12110

Interim Report, MA—RD—920—77090, May 10, 1977, 78pp

The report presents the results of a literature survey on the basis of which an assessment of the state—of—the—art in stern tube bearing and seal materials was performed. The results indicate a need for better seal materials and more effective seal designs if the reliability of stern tube seals in large commercial vessels is to be improved. In the area of bearings, the material problem appears to be less critical. Tin based babbitts and some commercially available plastic materials appear to be yielding reasonably good performance under normal conditions of operation. The problem becomes more acute at jacking and reverse shaft speeds as well as on ships of new design where hull and rotor deflections are alone, or in combination with dynamic loading, forcing the bearings to operate under conditions where the load capacity is marginal. This combination results in excessive bearing wear.

NTIS
Maritime Administration

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199612
MANUFACTURE, TEST AND CHECK—OUT OF A MODEL CONTRAROTATING EPICYCLIC GEAR AND OFFSET GEARBOXES

Demetropoulos, J

Transmission Technology Company, Incorporated, 9 Commerce Road, Fairfield, New Jersey 07006

Final Report, MA—RD—920—78040, March 1978, 27pp

The advantages that may be realized by hydrodynamically coupled propellers require demonstration in a model basin. This report covers the manufacture and test of the epicyclic and offset gearboxes for the model basin tests. The test rig was extremely stable in operation. Sudden load increments resulted in smooth speed changes to a new stable speed ratio.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—920—78040.

199625
DESIGN AND EVALUATION OF A HIGHLY SKEWED PROPELLER

Farrell Lines, Incorporated, One Whitehall Street, New York, New York 10004

Final Report, MA—RD—940—79015, Jan 1979

This report discusses the design process and evaluation of a highly skewed propeller installed on the Sea Bridge Class (MarAd Design C5—S—78a) roll—on/roll—off cargo vessel. It considers both propeller excited vibratory forces and cavitation erosion. The highly skewed propeller installed on the S.S. DEFIANCE produced far less vibration than the previously fitted conventional propeller. Considerable improvement in comfort water was noted, especially while operating at full power in shallow waters. The reduction of propeller blade cavitation erosion has not been proven yet on the full—scale propeller. However, predictions made by correlating the test results of the model propeller with the actual full—scale conventional propeller erosion indicate that the highly skewed propeller should have a longer life from an erosion stand point than the conventional propeller.

NTIS
Maritime Administration

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199629
ANALYSIS AND DESIGN OF ADVANCED STERN—TUBE BEARING SYSTEMS

Pinkus, O

Mechanical Technology Incorporated, 968 Albany—Shaker Road, Latham, New York 12110

Interim, MA—RD—920—79009, Oct 1978

This report covers the development of new bearing concepts aimed at improving the conditions and reliability of stern—tube bearing operation. An analysis of shaft bending and bearing performance has been translated into appropriate computer programs which provide comprehensive solutions to the shaft—bearing problem. Two new bearing arrangements, one rigid and one self—aligning, both containing new bearing designs, are proposed which provide system optimization for each particular vessel. A sample analysis of an actual 380,000 DWT tanker is conducted in order to show the striking superiority of the proposed new bearing designs.

NTIS
Maritime Administration

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199634
OPTIMIZATION OF PROPELLER SKEW DISTRIBUTION TO MINIMIZE THE VIBRATORY FORCES AND MOMENTS ACTING AT THE PROPELLER HUB

Parsons, MG Greenblatt, JE

University of Michigan, Department of Naval Architecture & Marine Engineering, Ann Arbor, Michigan 48109

Final Report, MA—RD—940—79023, Dec 1978, 58pp

Propeller skew is now well recognized as a means of reducing the unsteady forces and moments produced by the propeller. The propeller skew design problem is formulated as an optimization problem to minimize a weighted, linear combination of the six vibratory forces and moments acting at the propeller hub. The skew distribution is taken as a cubic or quadratic function of radius subject to realistic geometric constraints. This allows the optimization to be economically solved using existing constrained, nonlinear mathematical programming or parameter optimization methods. The SKEWOPT propeller skew optimization program is described. This interactive program was developed to perform the propeller skew optimization in a routine design setting. The vibratory forces and moments are evaluated using either a two—dimensional, sinusoidal gust theory or a three—dimensional, unsteady, lifting line theory. The optimization is performed by an external penalty function technique utilizing the Nelder and Mead simplex search. Design examples using the SKEWOPT program are presented to illustrate the use of the program and to validate the propeller skew design approach.

NTIS
Maritime Administration

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199650
SKEWOPT: PROPELLER SKEW OPTIMIZATION PROGRAM: USER'S AND PROGRAMMER'S DOCUMENTATION

Greenblatt, JE

University of Michigan, Ann Arbor, Michigan 48109

Interim, MA—RD—940—79022, Aug 1978, 151pp

The SKEWOPT propeller skew optimization program is presented. This program models skew distribution as a piecewise cubic or quadratic function of radius. The skew distribution is then optimized using constrained, non—linear mathematical programming to minimize a user—specified weighted, linear combination of the amplitudes of the six unsteady forces and moments acting at the propeller hub. Forces and moments may be evaluated by either a two—dimensional, sinusoidal gust technique or by a three—dimensional, lifting—line approach. The program is highly interactive and incorporates a number of options in an attempt to provide an effective, moderate cost design tool. Skew distribution modeling, optimization technique, and program organization are discussed. Derivations used in the problem formulation are summarized in Appendix A. Use of the program on the Michigan Terminal System (MTS) time—sharing network and examples of program use are given in Appendix B. Appendices C and D cover programmer documentation and provide a source listing, respectively.

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199668
MATERIAL STUDY FOR ADVANCED STERNTUBE SEALS AND BEARINGS FOR HIGH PERFORMANCE MERCHANT SHIPS

Bhushan, B Winn, LW

Mechanical Technology Incorporated, 968 Albany—Shaker Road, Latham, New York 12110

Interim, MA—RD—920—79069, June 1979

The objective of the program was to conduct a comprehensive material study for stern tube bearing and seal applications primarily for oil—lubricated usage. Selected polymeric materials were subjected to soak tests and friction and wear tests. The liner materials were subjected to corrosion tests. Based on the tests, the following materials were recommended for bearing and face seals: polyimide, 15% graphite powder filled; polyamide—imide, 3% Teflon and 12% graphite powder filled; and phenolic, 15% graphite powder filled. The liner materials could be the same as those which are currently used: ABS Grade 2 and NOROC for bearings, and Niresist Type 2 for face seals. The materials could also be successfully used in seawater lubrication. Materials recommended for lip seals are: Butadiene Acrylonitrile Copolymer — NBR. Vinylidene fluoride—hexafluoro propylene copolymer viton 2282, and Perfluoroelastomer (Kalrez 1050). NOROC 277 seems to work better and this or its equivalent should be used. It is recommended that the elastomers should be filled with solid lubricants to improve their friction and wear properties without losing hardness and other desirable mechanical properties.

NTIS
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199669
TECHNICAL REQUIREMENTS FOR HIGH POWERED SINGLE SCREW PROPULSION OF MERCHANT SHIPS: PART 1: VOLUME I

Atlas, R Chang, PY Roseman, DP Scherer, JO
Tomassoni, CA Wechsler, L

HYDRONAUTICS, Incorporated, Pindell School Road, Laurel, Maryland 20810

Executive Summary, MA—RD—940—79032—VolI—PT1, Jan 1979, 23pp

This report describes the work done in assessing the technical requirements for high powered single screw propulsion of merchant ships. A literature search and personal interviews were conducted to ascertain the maximum power currently in use in single screw ships, the availability of high power components for ships, and problems encountered in service. A complete bibliography is included. The collected data were analyzed, possible problem areas identified, the state—of—the—art was determined, research requirements were identified and a research and development program is presented which, if carried out, will permit the design and construction of single screw ships of continuously increasing power.

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199670
TECHNICAL REQUIREMENTS FOR HIGH POWERED SINGLE SCREW PROPULSION OF MERCHANT SHIPS: PART 2: VOLUME I

Atlas, R Chang, PY Roseman, DP Scherer, JO
Tomassoni, CA Wechsler, L

HYDRONAUTICS, Incorporated, Pindell School Road, Laurel, Maryland 20810

Executive Summary, MA—RD—940—79032—VolI—PT2, Jan 1979

This report describes the work done in assessing the technical requirements for high powered single screw propulsion of merchant ships. A literature search and personal interviews were conducted to ascertain the maximum power currently in use in single screw ships, the availability of high power components for ships, and problems encountered in service. A complete bibliography is included. The collected data were analyzed, possible problem areas identified, the state—of—the—art was determined, research requirements were identified and a research and development program is presented which, if carried out, will permit the design and construction of single screw ships of continuously increasing power.

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054018
BIBLIOGRAPHY OF MARINE NUCLEAR STANDARDS

McMichael, DB

National Maritime Research Center, Galveston, Texas 77550

NMRC—273—34200—R1, Feb 1974, 34pp

This bibliography is representative of all useful reading reference material used in the development of a workable handbook showing cross—reference to present international data and identifying areas where international committees need to be created to agree on a standardized program for nuclear ship construction and operation. The handbook was the primary undertaking of the National Maritime Research Center——Galveston FY—73 Work Program Project, Commercial Nuclear Ship Standards. The bibliography is divided into three codes: Code 1 is representative of documents deemed current, relevant and marine—related; Code 2 is representative of documents deemed relevant and marine—related; and Code 3 is representative of documents deemed to be relevant, whether or not current or marine—related.

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071916
INTERNATIONAL MARINE NUCLEAR STANDARDS CROSS INDEX——VOLUMES I AND II

McMichael, DB

National Maritime Research Center, Galveston, Texas 77550

MA6562, Aug 1974, 864pp

The National Maritime Research Center——Galveston set up a Task in April 1973, to Prepare International Standards for Commercial Nuclear Ships. The objective was to prepare a cross—reference document which lists all of the available national and international standards and regulations for commercial nuclear ship construction and operation. To implement this task, a world wide correspondence was initiated. Replies from 53 addressees were received, of which 38 were considered useful and meaningful at this time. From these were chosen the following: IMCO & IAEA; South Africa Atomic Energy Board; New Zealand AEC; N.S. Savannah——Port Operation Criteria; Otto Hahn——Technical Safety Evaluation; Safety of Life at Sea Convention; Babcock & Wilcox; USAEC: United States Coast Guard; U.S. Navy; Society of Naval Architects and Marine Engineers; American Bureau of Shipping; Lloyds Register; Germanischer Lloyd; Registro Italiano; Bureau Veritas; Nippon Kaiji Kyokai; N.S. Savannah Safety Assessment; Brazil National Nuclear Energy Commission; U.S.S.R. Register of Shipping. Volume I (32 pages) consists of the resulting regulatory data and state—of—the—art information which has been divided into 30 broad headings with additional subheadings covering every phase of the nuclear ship concept. A supporting compendium, Volume II (832 pages), consists of a linear, full text presentation of the principal sources previously listed, plus several additional sources related only to the Insurance, Liability and Indemnity Title.

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128209
ENGINEERING DESIGN AND ECONOMIC STUDIES OF THE HEAVY—DUTY INDUSTRIAL GAS TURBINE IN A LIQUEFIED PETROLEUM GAS CARRIER

J.J. Henry Company, Incorporated, New York, New York 10048

Final Report, MA—RD—930—76—03, June 1975, 123pp

This report presents the results of an engineering design and economic evaluation of the installation of a 24,000 SHP Heavy Duty Industrial Gas Turbine propulsion plant in a LPG Carrier under the terms of MA Contract 5—38020 between the Maritime Administration and J.J. Henry Co., Inc. The report provides Contract Plans and Specifications, and compares the operating costs and performance with those of a steam propulsion plant of equivalent power. The annual operating costs of the gas turbine are somewhat lower than those of the steam propulsion plant; however, the savings do not provide an unquestionable basis for selection. To be truly competitive, the gas turbine must have a lower fuel rate, and provide a means of reversing at lower cost.

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129889
ECONOMIC COMPARISON OF VARIOUS MARINE POWER PLANTS——1974

Femenia, J

National Maritime Research Center, Kings Point, New York 11024

Final Report, MA—RD—900—76013, Aug 1975, 41pp

This report gives comparative annual operating costs (including capital charges) for a number of types of marine power plants over the range of 10,000 to 50,000 SHP (single screws). Included are two and four—heater steam, reheat steam, diesel and gas turbine plants. Results are intended to give marine engineers, naval architects, and managerial personnel easily useable data for estimating comparative costs of various marine power plants.

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129890
ALTERNATE ENERGY SOURCES FOR MARINE POWER PLANTS

Femenia, J

National Maritime Research Center, Kings Point, New York 11024

NMRC—KP—144, Sept 1975, 22pp

This report discusses the size of ship power plants and other factors governing the suitability of different types of fuel for marine use. It then considers various alternatives to traditional fuels derived from crude petroleum. Types of fuel considered are other liquid hydrocarbon fuels, both natural and synthetic, hydrocarbon fuels in solid, liquid/solid, and gaseous forms, non—hydrocarbon fuels and solar and wind energy.

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131607
MARINE CLOSED GAS TURBINE AND LNG REFRIGERATION SYSTEM STUDY. EXECUTIVE SUMMARY

Rackley, RA

AiResearch Manufacturing Company, Phoenix, Arizona 85034

MA—RD—920—75002, 48pp

A conceptual design study was conducted to develop a family of closed gas turbine engines satisfying many marine applications. Complete engine systems, including rotating group, heat exchangers, heat source, and control system were designed for both 9000 hp auxiliary electro—mechanical units, and small craft propulsion engines and also for 40,000, 60,000 and 80,000 hp helium cycle ship's propulsion engines. Further studies conducted revealed the closed gas turbine installations to offer definite economic advantages to the maritime industry, compared to steam, diesel or open cycle gas turbine plants. A second design study was conducted to analyze systems to control cargo boil—off from LNG tankers and to assess the impact of such systems on the economics of these tankers. Reliquefaction and subcooling approaches were considered using nitrogen—cycle reverse Brayton machines. Elimination of LNG boil—off was found to be feasible and economical provided the ratio of LNG cost to fuel oil cost was high.

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138114
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 5. REGENERATOR IMPROVEMENT VOLUME B (PRESSURE TUBE DESIGN)

Kaplan, SM

General Electric Company, Schenectady, New York 12306

MA—RD—930—76025, 234pp

This document describes a part of the work performed within Task 5, Regenerator Improvement of the Heavy—Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. The costs of this program are shared equally by the U.S. Department of Commerce, Maritime Administration and the General Electric Company, Gas Turbine Products Division. This document represents one of two volumes of the Task 5 Final Report. It covers all design, development, analyses and component testing performed to develop the selected optimum regenerator design, the "Pressure Tube" concept. This design makes use of state—of—the—art developments in brazing and other manufacturing technology to enable conceptual attainments in size weight and cost reductions. Task efforts culminated in system—level testing of a 1/10—section, full—scale module of this design. Some additional effort is needed to transform the pressure tube regenerator from a concept to a production design.

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141217
FUNCTIONAL PERFORMANCE OF THE HELICAL COIL STEAM GENERATOR CONSOLIDATED NUCLEAR STEAM GENERATOR (CNSG) IV SYSTEM

Watson, GB

Babcock and Wilcox Company, Alliance Research Center, Alliance, Ohio 44601

MA/RD—920—76018—ES, 58pp

The objective of this project was to study the functional performance of the CNSG — IV helical steam generator to demonstrate that the generator meets steady—state and transient thermal—hydraulic performance specifications and that secondary flow instability will not be a problem. Economic success of the CNSG concepts depends to a great extent on minimizing the size of the steam generator and the reactor vessel for ship installation. Also, for marine application the system must meet stringent specifications for operating stability, transient response, and control. The full—size two—tube experimental unit differed from the CNSG only in the number of tubes and the mode of primary flow. In general, the functional performance tests demonstrated that the helical steam generator concept will exceed the specified superheat of 35F at 100% load. The experimental measured superheat at comparable operating conditions was 95F. Testing also revealed that available computer codes accurately predict trends and overall performance characteristics.

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142803
LOW EXCESS AIR, HIGH PERFORMANCE COMBUSTION SYSTEM FOR MARINE BOILERS

Hague International Corporation, 3 Adams Street, South Portland, Maine 04106

MA—RD—920—76045 152pp

A design study was performed on low excess air combustion systems for a marine boiler having a nominal rating of 100,000 pph at 955 F, 875 psig. Two combustion configurations were selected for detailed evaluation consisting of (a) a staged furnace containing three combustion zones separated by a novel air introduction means, and (b) a conventional furnace configuration with massive recirculation burners. Based on earlier experimental work, excess air levels were predicted at less than 1% and less than 5%, respectively. The principal advantage expected due to low excess air is a reduction in the cost of maintenance and an improvement in overall performance. The staged combustion process offered the additional advantage of uniform velocity and temperature profiles to the superheater. An economic evaluation reveals that for the most cost effective system the initial investment would be recovered in less than three years. The ratio of present worth of future savings over 10 years discounted at 11— 1/9%/annum to initial investment was found to be from about 2 to 14 for the most cost effective systems.

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159255
IMPROVED MARINE BOILER RELIABILITY. PHASE II. VOLUME V. THERMOCOUPLE MODERNIZATION

Combustion Engineering, Incorporated, Marine Power Systems, Windsor, Connecticut 06095

Final Report, MA—RD—920—77020, Feb 1977, 61pp

This report outlines the current Combustion Engineering, Inc. experience and practice in the development and application of thermocouples to modern boiler technology. A series of thermocouple application designs is described. Typical installation drawings are presented, and remarks concerning the state of the art of thermocouple technology are included.

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159273
SHIPBOARD HEAT RECOVERY PROGRAM FOR U.S. MERCHANT SHIPS

Woodson, CW

Mechanical Technology Incorporated, 968 Albany—Shaker Road, Latham, New York 12110

MA—RD—940—77029, 84pp

The feasibility of recovering waste energy aboard U.S. Flag ships has been investigated. Utilizing a combination of heat sources, about 300 kw of power can be recovered from a typical 24000 hp steam ship. Small inland waterways diesel powered ships (approximately 2800 SHP) offer a promising opportunity to recover waste stack heat. Typical hardware layouts are presented based on the use of freon as the rankine cycle power fluid.

NTIS

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166706
ENVIRONMENTAL IMPACT ANALYSIS OF THE NUCLEAR MERCHANT SHIP PROGRAM—ADDENDUM

NUS Corporation, 4 Research Place, Rockville, Maryland 20850

NUS—1926 130pp

This study represents a qualitative extension of an earlier Environmental Impact Analysis of the Nuclear Merchant Ship Program (MarAd, 1975) using an Ultra Large Crude Carrier (ULCC) as the reference ship, to other types of ships including a containership, dry—bulk cargo vessel, and an icebreaking oil tanker. This qualitative analysis shows that, for ships operating into coastal ports (containerships and possibly dry—bulk carriers), both ecological and radiological impacts would be somewhat greater than for the reference ULCC docking at an offshore terminal. These impacts can be kept within the guidelines established for land based nuclear power plants by implementation of appropriate operating procedures.

NTIS

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167780
HIGH PERFORMANCE REHEAT MARINE STEAM PROPULSION PLANT. PHASE I

General Electric Company, Lynn, Massachusetts 01910

Final Report, Jan 1976, 101pp

This report discusses heat balances for full power and 70% power which will be compared to balances to be done in phase 2 to evaluate gains due to cycle changes. Available information was assembled on high temperature materials. Parametric studies were made of stresses in wheels and buckets taking into account centrifugal effects and steam forces. Preliminary studies were made on machinery arrangements of HP and 1P turbine(s). Calculations were made of thermal performance to determine influence of number of stages, diameter, rotational speed, etc. on the design of HP and IP turbines. Auxiliary turbine designs were roughed out.

Maritime Administration

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167781
AN INVESTIGATION OF THE TECHNICAL ECONOMIC FEASIBILITY OF APPLYING THE D—CYCLE TO MARINE PROPULSION

D—Cycle Power Systems Incorporated, Richmond, Virginia 23225

Final Report, June 1976, 96pp

This report contains: A summary description of a condensing vapor cycle with a steam compression step, known as the D—Cycle. The application of the D—Cycle to marine propulsion is considered and discussed. The cycle is applied to five different marine rankine cycles. Heat balances are developed for the D—Cycle applications. Two D—Cycles are selected for further analysis. For the two chosen cycles, costs are developed, and effect of the D—Cycle introduction on the cost of ship operation is estimated. Requirements for fitting the 2 chosen cycles to new ships and for retrofitting are discussed.

Maritime Administration

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168687
HIGH PERFORMANCE REHEAT MARINE STEAM PROPULSION PLANT

Roy, D Miffitt, J Casey, J Romano, J Marquis, A

General Electric Company, Schenectady, New York 12306

Final Report, MA/RD—920—77056, June 1977, 219pp

This report contains the engineering studies, design analyses and analytical investigations that were performed to identify, define and develop the design data, engineering details and operational requirements for a high performance marine reheat steam propulsion plant. Special studies were conducted in the following areas: high pressure, and intermediate pressure turbine construction, propulsion gear and attached auxiliaries, low pressure and astern turbine construction, turbine control and monitoring equipment, general propulsion plant arrangements, thermodynamics and acquisition cost estimates for major components. This report clearly indicates that a high performance reheat steam propulsion plant is technically feasible and economically justifiable. This report also highlights the need for additional design development of such components as boilers and feed pumps.

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168751
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 4. DIRECT REVERSING TURBINE DEVELOPMENT. FINAL REPORT. VOLUME B. TEST VEHICLE ASSEMBLY AND TESTING

Kaplan, SM

General Electric Company, Schenectady, New York 12306

74GTD19, 232pp

This document describes part of the work performed within Task 4, Direct Reversing Gas Turbine Development, of the Heavy—Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. This Volume B of the Task 4 Final Report covers reversing turbine test vehicle assembly and system level testing; work done in the design, development and component testing of same is presented in companion Volume A. Task efforts have developed an assembly of parts to simulate a reversing marine gas turbine that has minimum effects on ahead performance, maintenance and reliability of the overall propulsion system. This has been attained via the design and development of this test vehicle, a modified GE—GTPD model MS—3002 (11,000 HP) gas turbine to

which was added the specially designed load turbine. This test vehicle was used to empirically evaluate the reversing turbine concept. The test vehicle was assembled and subjected to extensive system—level testing that demonstrated the direct reversing turbine concept. All test objectives were met. (Portions of this document are not fully legible)

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168752
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 2. TURBINE CLEANING. FINAL REPORT

Kaplan, SM

General Electric Company, Schenectady, New York 12306

74GTD17, 54pp

This report describes the work performed within Task 2, Turbine Cleaning, of the Heavy Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. The costs of this program are shared equally by the U.S. Department of Commerce, Maritime Administration and General Electric Company, Gas Turbine Products Division. Task efforts have established the optimum viable automatic turbine cleaning and washing system, together with the operational requirements to insure its proper applications. This turbine cleaning system is necessary to remove the ash deposits formed on first—stage nozzles of residual fuel—burning gas turbines.

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168753
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 7. PROJECT MANAGEMENT. FINAL REPORT

Kaplan, SM

General Electric Company, Schenectady, New York 12306

74GTD58 102pp

This task final report describes the work performed within Task 7, Project Management, of the Heavy—Duty Gas Turbine Development Program, or MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. This task final report describes the project management systems set up for the MARAD Project, and how they were implemented. Project management, both for the total project and each task therein, is described as it was applied throughout the duration of the project.

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168754
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 1/6. OPERATIONAL PERFORMANCE AND MAINTENANCE IMPROVEMENT. FINAL REPORT. VOLUME B. MATERIALS DEVELOPMENT

Kaplan, SM

General Electric Company, Schenectady, New York 12306

74GTD57, 353pp

This document describes part of the work performed within Task 1/6, Operational Performance and Maintenance Improvement, of the Heavy—Duty Gas Turbine Development Program or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine propulsion. This Volume B covers materials development efforts; Volume A covers rig testing and fuel additive development, and Volume C encompasses other research efforts. This volume describes research efforts directed toward establishing the best discrete materials(s) for application in residual fuel—burning gas turbines. A large number of materials were concurrently investigated initially: (1) alloys: (2) composites; (3) EB coatings; (4) claddings; (5) diffusion coatings, and (6) ceramics. Intensive development evaluations (including fabrication of trial components) showed the sheet cladding to be the best material.

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168755
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 1/6. OPERATIONAL PERFORMANCE AND MAINTENANCE IMPROVEMENT. FINAL REPORT. VOLUME C. OTHER RESEARCH INVESTIGATIONS

Kaplan, SM

General Electric Company, Schenectady, New York 12306

74GTD47, 247pp

This document describes a part of the work performed within Task 1/6, Operational Performance and Maintenance Improvement, of the Heavy—Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. The costs of this program are shared equally by the U.S. Department of Commerce, Maritime Administration and the General Electric Company, Gas Turbine Products Division. This document represents one of three volumes of the Task 1/6 Final Report. It describes project efforts within the following areas: (1) physical chemistry; (2) electrochemistry; (3) contaminant removal; (4) cooling investigation; and (5) determination of probablistic sodium content within unwashed residual fuel oils. These results are of technical value, and provide bases for longer range marine gas turbine developments. (Portions of this document are not fully legible)

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168756
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 1/6. OPERATIONAL PERFORMANCE AND MAINTENANCE IMPROVEMENT. FINAL REPORT. VOLUME A. RIG TESTING AND FUEL ADDITIVE DEVELOPMENT

Kaplan, SM

General Electric Company, Schenectady, New York 12306

75GTD4, 328pp

This document describes a part of the work performed within Task 1/6, Operational Performance and Maintenance Improvement, of the Heavy—Duty Marine Gas Turbine Development Program, or MARAD

Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of Marine power generation. The costs of this program are equally shared by the U.S. Department of Commerce, Maritime Administration and the General Electric Company, Gas Turbine Products Division. This document represents one of three volumes of the Task 1/6 Final Report. It describes project efforts within the following areas: (1) high pressure testing, using the 'turbine simulator', (2) contaminant inhibition effort to develop new fuel additives; (3) compressor cleaning media evaluations; and (4) intermediate sized rig testing. These results have technical significance, and pave the way towards marine gas turbines having increased performance while burning residual fuel. (Portions of this document are not fully legible)

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168757
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 3. FUEL CONDITIONING SYSTEM IMPROVEMENT. FINAL REPORT. VOLUME A. DEVELOPMENT OF AUTOMATIC FUEL ANALYSIS INSTRUMENT

Kaplan, SM

General Electric Company, Schenectady, New York 12306

75GTD5, 226pp

This document describes part of the work performed within Task 3, Fuel Conditioning System Improvement, of the Heavy—Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. This Volume A of the Task 3 final report covers the development of the automatic fuel analysis instrument, with work on the total fuel conditioning system being presented in Volume B. Task efforts culminated with the assembly and successful testing of the prototype of the automatic fuel analysis instrument (needed to make the optimum viable automatic marine fuel treatment system a reality). This instrument is based on an RF plasma technique. An aerosol of residual fuel droplets is continuously introduced into an RF plasma (argon) to produce the characteristic spectral lines of the critical trace elements within the fuel. An optical background correction system coupled to a small computer signal processing system extracts the signals and converts them into a direct read—out. (Portions of this document are not fully legible)

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168758
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 3. FUEL CONDITIONING SYSTEM IMPROVEMENT. FINAL REPORT. VOLUME B. TOTAL SYSTEM AND DEVELOPMENT INVESTIGATIONS

Kaplan, SM

General Electric Company, Schenectady, New York 12306

74GTD46 114pp

This document describes part of the work performed within Task 3, Fuel Conditioning System Improvement, of the Heavy—Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. This Volume B of the Task 3 final report covers total system investigations, with the work on the automatic fuel analysis instrument described in Volume A. Task efforts have established the optimum viable automatic fuel conditioning system. This system is necessary to remove the sodium and inhibit the vanadium found in residual fuel oils. This system consists of: (a) automatic fuel analysis instrument; (b) semi—automatic fuel treatment and processing equipment; and (c) double day tanks. In addition, a practical and economic simplification of this system has been synthesized. This system is simpler and 25% smaller than the current system.

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168759
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 5. REGENERATOR IMPROVEMENT. FINAL REPORT. VOLUME A (PRESSURIZED STRONGBACK DESIGN)

Kaplan, SM

General Electric Company, Schenectady, New York 12306

74GTD59, 441pp

This document describes a part of the work performed within Task 5, Regenerator Improvement of the Heavy—Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. The costs of this program are shared equally by the U.S. Department of Commerce, Maritime Administration and the General Electric Company, Gas Turbine Products Division. This document represents one of two volumes of the Task 5 Final Report. It covers all design, development, analyses and component testing performed to develop the 'back—up' regenerator design, the 'Pressurized Strongback' concept. This less ambitious back—up represents a major redesign of the original regenerator to increase its cyclic life to make it suitable for marine applications; its core life has been increased by a factor of 10. The pressurized strongback design is now featured in many General Electric requisitions. (Portions of this document are not fully legible)

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168760
HEAVY—DUTY MARINE GAS TURBINE PROJECT. TASK 4. DIRECT REVERSING TURBINE DEVELOPMENT. FINAL REPORT. VOLUME A. DESIGN AND DEVELOPMENT

Kaplan, SM

General Electric Company, Schenectady, New York 12306

75GTD6, 409pp

This document describes part of the work performed within Task 4, Direct Reversing Gas Turbine Development, of the Heavy—Duty Gas Turbine Development Program or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. This Volume A of the Task 4 final report covers reversing turbine design, development, supporting analyses and component — level testing; assembly and testing of the reversing turbine test vehicle is presented in Volume B. Task efforts have developed an assembly of parts to simulate a reversing marine gas turbine that has minimum effects on ahead performance, maintenance and reliability of the overall propulsion system. This has been attained via the design and development of this test vehicle, a

modified GE–GTPD model MS–3002 (11,000 HP) gas turbine to which was added the specially designed load turbine. This test vehicle was used to empirically evaluate the reversing turbine concept. The direct reversing turbine concept is described herein, along with the design approach, criteria and philosophy employed to define what the test vehicle exactly was to be and of what it should be comprised. Systems engineering, aerothermodynamics and controls–dictated design criteria are also given. Design, supporting analyses and other development of the special load turbine are also presented. Results of component–level aerothermodynamic and mechanical tests are also given herein. Economic viability investigations performed during the course of this program are also presented.

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169626
IMPROVEMENTS IN NON–REHEAT STEAM PROPULSION – RETROFIT AND NEW CONSTRUCTION

DeLaval Turbine, Incorporated, Turbine and Compressor Division, P. O. Box 251, Trenton, New Jersey 08602

Final Report, MA–RD–920–77086, Sept 1977, 249pp

Proposed improvements to major components and systems of non–reheat steam plants are investigated on an individual basis. Both technical and economic advantages and disadvantages are developed and identified. Selected individual components are then combined in several arrangements and the resulting systems evaluated with respect to fuel consumption and capital costs. Consideration is given to both new construction and retrofit applications. Additional details are given in Report PB–273 053.

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169627
IMPROVEMENTS IN NON–REHEAT STEAM PROPULSION – RETROFIT AND NEW CONSTRUCTION. APPENDIX

DeLaval Turbine, Incorporated, Turbine and Compressor Division, P. O. Box 251, Trenton, New Jersey 08602

MA–RD–920–77087, Sept 1977, 372pp

Proposed improvements to major components and systems of non–reheat steam plants are investigated on an individual basis. Both technical and economic advantages and disadvantages are developed and identified. Selected individual components are then combined in several arrangements and the resulting systems evaluated with respect to fuel consumption and capital costs. Consideration is given to both new construction and retrofit applications. Results are summarized in Report PB–273 052.

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199318
MARINE GAS TURBINE APPLICATIONS MANUAL, VOLUME I: HEAVY–DUTY GAS TURBINE DESIGN, PERFORMANCE, AND APPLICATION DATA

Kaplan, SM

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Final Report, MA–RD–920–75065, Apr 1, 1975, 178pp

This document describes a part of the work performed within Task 8, Marine Systems Engineering and Analysis of the Heavy–Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy–duty gas turbine as an alternate competitive form of marine power generation. The costs of this program are shared equally by the U.S. Department of Commerce, Maritime Administration and the General Electric Company, Gas Turbine Products Division. This document represents one of three volumes of the Task 8 Final Report. It presents Volume I, Design, Performance and Application Data of the Marine Gas Turbine Applications Manual developed in this task. This specific volume covers gas turbine design parameters, performance, and application data to permit owners, naval architects, and shipyards to select the correct gas turbine and to evaluate performance of the integrated system.

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199324
MARINE HEAVY–DUTY GAS TURBINE DEVELOPMENT PROJECT

Kaplan, SM

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Executive Summary, MA–RD–930–7604, June 29, 1975, 73pp

This document presents an executive summary report of the efforts performed within the Heavy–Duty Marine Gas Turbine Development Program, or MARAD Project. The MARAD Project was an integrated effort to develop the Heavy–Duty Gas Turbine as an alternate competitive form of marine power generation. The costs of this program were shared equally by the U.S. Department of Commerce, Maritime Administration and the General Electric Company, Gas Turbine Products Division. This executive summary describes the motivation for initiating the project, the program development and evolution, and program results. Project documentation (task technical report volumes) is also summarized.

NTIS
Maritime Administration

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199407
HEAVY DUTY MARINE GAS TURBINE DEVELOPMENT PROJECT: DECEMBER 1973 – MARCH 1974

Kaplan, SM

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Progress Report, 74–GTD–41, Jan 31, 1974, 170pp

This integrated development program for an improved marinized heavy–duty gas turbine has the following basic objectives: (1) high power outputs suitable for the largest merchant marine applications; (2) lower initial and operating costs when compared with current installations; and (3) unrestricted Bunker "C" fuel burning capability. This

project currently consists of the following six (6) interrelated technical tasks: (1) Operational Performance and Maintenance Improvement; (2) Turbine Cleaning; (3) Fuel Conditioning System Improvement; (4) Reversing Marine Gas Turbine Development; (5) Regenerator Improvement; and (6) Marine Systems Engineering Analysis. This fourteenth progress report covers the December 20 to March 20 period, and essentially summarizes project activities for the first quarter of 1974. Steady progress has been made in all task areas during this report period.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number 74—GTD—41.

199417
HEAVY—DUTY MARINE GAS TURBINE DEVELOPMENT PROJECT: SEPTEMBER — DECEMBER 1973

Kaplan, SM

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Progress Report, GTD—41—74, Jan 31, 1974, 170pp

This integrated development program for an improved marinized heavy—duty gas turbine has the following basic objectives: (1) high power outputs suitable for the largest merchant marine applications; (2) lower initial and operating costs when compared with current installations; (3) unrestricted Bunker "C" fuel burning capability. This project currently consists of the following six (6) interrelated technical tasks: (1) Operational Performance and Maintenance Improvement; (2) Turbine Cleaning; (3) Fuel Conditioning System Improvement; (4) Revering Marine Gas Turbine Development; (5) Regenerator Improvement; and (6) Marine Systems Engineering and Analysis. This thirteenth progress report covers the September 20 to December 20 period, and essentially summarizes project activities for the fourth quarter of 1973. Steady progress has been made in all task areas during this report period.

NTIS
Maritime Administration

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199421
COMPETITIVE MARINE PROPULSION SYSTEMS ANALYSIS

Booz Allen Applied Research, Incorporated, 4330 East West Highway, Bethesda, Maryland 20014

Final Report, B—6CMPSA, May 1973

This report covers Phase I of the Maritime Administration's Contract No.1—35058 entitled A Systems Analysis of Marine Propulsion Systems. The objective of Phase I is to determine the relative economic and technological merit of those competing marine propulsion systems that could be brought to the point of commercial acceptance for ships built as a result of the 1970 Maritime Act and subsequent legislation. The analysis of the competing propulsion systems is used as the basis of recommendations and a priority assessment for the continuing research and development programs of the Maritime Administration directed at the revitalization of the U.S. Merchant Marine. Seventeen propulsion systems are analyzed in five power ranges from 0 to 240,000 SHP, covering the period 1971 to 2005. Both nuclear and fossil systems are examined using a series of eight reference ships, four cargo types, and a variety of route distances up to 12,500 nautical miles. The overall economic merit of the competing propulsion systems is estimated on the basis of transportation cost reductions, foreign fuel purchase reductions, and potential for overseas sales. An 8 percent discount rate is used to obtain the net present value (N.P.V.) of the relative economic benefits in 1970 dollars. The estimates are based on world and U.S. trade forecasts, projections of world and U.S. fleets and propulsion plant requirements, current technology analysis, a technology forecast for propulsion systems, an economic analysis of the selected propulsion systems installed in the reference ships, and an overall benefit analysis of each system.

NTIS
Maritime Administration

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199423
VIDEC PHASE II (SYSTEM FABRICATION AND INSTALLATION)

Clay, WH Derrah, AS

Raytheon Company, Portsmouth, Rhode Island

Final Report, MA—RD—900—75001, Dec 1974, 70pp

This report relates the VIDEC Phase II program over a two year period, describes the VIDEC Performance Monitoring System and its operation and narrates major program events and the coordination and cooperation of the participating parties from government and industry. The report also provides a preliminary analysis of potential benefits to be derived from such a monitoring system.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—900—75001.

199434
MARINE CLOSED GAS TURBINE AND LNG REFRIGERATION SYSTEM STUDY: VOLUME II — SHIPBOARD LNG REFRIGERATION SYSTEM

Rackley, RA

AiResearch Manufacturing Company, Phoenix, Arizona 85034

Final Report, MA—RD—75004, June 30, 1974

A conceptual design study was conducted to develop a family of closed gas turbine engines satisfying many marine applications. Complete engine systems, including rotating group, heat exchangers, heat source, and control system were designed for both 9000 hp auxiliary electro—mechanical units, and small craft propulsion engines and also for 40,000, 60,000 and 80,000 hp helium cycle ship's propulsion engines. Further studies conducted revealed the closed gas turbine installations to offer definite economic advantages to the maritime industry, compared to steam, diesel or open cycle gas turbine plants. A second design study was conducted to analyze systems to control cargo boil—off from LNG tankers and to assess the impact of such systems on the economics of these tankers. Reliquefaction and subcooling approaches were considered using nitrogen—cycle reverse Brayton machines. Elimination of LNG boil—off was found to be feasible and economical provided the ratio of LNG cost to fuel oil cost was high.

Maritime Adminstration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—75004.

199442
NUCLEAR MERCHANT SHIP OPERATIONS: EXPERIENCES AND RECOMMENDATIONS

Cain, RD

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—272—24000—R1, May 1973

This report presents recommendations for improvement of maintenance requirements for future nuclear propulsion systems. These recommendations are the results of analysis of the N.S. SAVANNAH, GNS OTTO HAHN operations, and discussions with personnel involved in the N.S. SAVANNAH program. The recommendations are for use as guidelines during the preliminary design phase for the nuclear propulsion system.

Maritime Adminstration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—272—24000—R1.

199452
FINAL REPORT FOR VIDEC PERFORMANCE MONITORING SYSTEM: PHASE III: TEST AND EVALUATION

Wallace, RP Lind, ER Trickey, EN Greene, CR

Raytheon Company, Portsmouth, Rhode Island

MA—RD—930—76052, Aug 1976

This VIDEC Phase III Final Report covers the VIDEC evaluation program (January 1974 through March 1976). During this reporting period, the VIDEC performance monitoring system operated while the test ship S.S. PRESIDENT JOHNSON completed nine voyages from the U.S. to Far East ports and return. VIDEC system modifications have occurred as a result of the developments during the initial voyages. Thermal and vibration data have been reduced and analyzed by subcontractors, and their reports have been included. System problems and evaluation program problems are identified. Conclusions and recommendations establish guidelines for future systems.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—76052.

199456
PUMP DIFFUSER EVALUATION PROGRAM, CONSOLIDATED NUCLEAR STEAM GENERATOR (CNSG) IV SYSTEM

Barrick, SM

Babcock and Wilcox Company, Research and Development Division, Alliance, Ohio

Final Report, MA—RD—920—76050, Feb 1976

The purpose of the Pump Diffuser Evaluation Program was to develop a diffuser between the reactor coolant recirculating pumps and the Modular—Once—Through Steam Generators. Two diffuser arrangements were evaluated using a 1/10.481 scale flow model of the CNSG diffuser section. Test results for 'Open Annulus' and 'Perforated Plate' diffuser designs are evaluated with respect to the flow distribution into the Modular—Once—Through Steam Generators (MOTSG), the height of the diffuser and the pressure drop through the diffuser section. Based on the test results, an 'Open Annulus' (no constrictions in the diffuser annulus) with a height of 16 inches is recommended for the full scale CNSG.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—920—76050.

199457
PUMP DIFFUSER EVALUATION PROGRAM, CONSOLIDATED NUCLEAR STEAM GENERATOR (CNSG) IV SYSTEM

Barrick, SM

Babcock and Wilcox Company, Research and Development Division, Alliance, Ohio

Executive Summary, MA—RD—920—76049, Feb 1976

The purpose of the Pump Diffuser Evaluation Program was to develop a diffuser between the reactor coolant recirculating pumps and the Modular—Once—Through Steam Generators. Two diffuser arrangements were evaluated using a 1/10.481 scale flow model of the CNSG diffuser section. Test results for 'open annulus' and 'perforated plate' diffuser designs are evaluated with respect to the flow distribution into the Modular—Once—Through Steam Generators (MOTSG), the height of the diffuser and the pressure drop through the diffuser section. Based on the test results, an 'open annulus' (no constricitions in the diffuser annulus) with a height of 16 inches is recommended for the full scale CNSG.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—920—76049.

199490
CRITICAL HEAT FLUX LIMITS FOR CNSG CONDITIONS

Howard, CG

Babcock and Wilcox Company, Nuclear Power Generation Division, Lynchburg, Virginia 24505

Final Report, BAW—1405, July 1973

The steady state critical heat flux (CHF) data provide the needed data base for safe design of a CNSG core. Transient tests, including power and pressure transients and simulated on and four—pumps coastdowns, show that steady state CHF correlations can be used for transient conditions.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC under reference number BAW—1405.

199496
TECHNICAL AND ECONOMIC EVALUATION OF INDUSTRIAL GAS TURBINE ELECTRIC DRIVE FOR "MAINE" CLASS ROLL ON/ROLL OFF: VOLUME II

John J. McMullen Associates, Incorporated, New York, New York 10048

Final Report, MJJ—1099—M, Jan 1974

This report evaluates the feasibility of an alternative propulsion system for the "Maine" class RO/RO ships. The analysis and findings are given in two reports. Volume I, prepared by Bath Iron Works Corp. (BIW) presents a summary of the study results. The technical and economic analysis and detail rationale are documented in Volume II, prepared under the direction of BIW by John J. Mc Mullen Associates.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MJJ—1099—M.

199507
FUNCTIONAL PERFORMANCE OF THE HELICAL COIL STEAM GENERATOR, CONSOLIDATED NUCLEAR STEAM GENERATOR (CNSG) IV SYSTEM

Watson, GB

Babcock and Wilcox Company, Alliance Research Center, Alliance, Ohio 44601

Final Report, MA—RD—920—76018—F, Oct 1975, 184pp

The two helical coils representing the steam generator in the CNSG—IV were tested in the Steam Generator Test Facility of the Alliance Research Center (ARC). This facility combines the capabilities of the Hot Water Test Facility and the Once—Through Steam Generator (OTSG) Test Facility to test steam generators at full system pressures and temperatures for both the primary and secondary sides using water as the test fluid. The report provides the arrangement schematic of the Steam Generator Test Facility used during the functional performance tests of the helical coil steam generator (HCSG). It emphasizes only that equipment used during the helical coil test. An OTSG ('A' generator) was also used to provide an additional heat sink so the primary side furnace could be fired at a higher rate, yet be within its controllable range.

NTIS
Maritime Administration

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199508
IMPROVED MARINE BOILER RELIABILITY

Combustion Engineering, Incorporated, Marine Power Systems, Windsor, Connecticut 06095

Final Report, MA—RD—920—76040, 478pp

This report investigates those factors in marine boiler design related to the reliability of the steam generating system. Topics covered include: (1) superheater tube corrosion and material lifetime, (2) heat recovery equipment corrosion and material lifetime, (3) oil burner configuration and design principles, in addition to sizing parameters, heat absorption, and natural circulation in marine boiler furnaces, (4) energy consumption of ancillary components of typical marine steam generators, (5) instrumentation requirements for performance assessment and long term reliability monitoring of components in a marine boiler, and (6) fuel oil chemical constituent analysis. The results are intended to expose those areas in the design, operation, or monitoring of steam generator performance which will lead to an awareness of problem areas, with the expectation that intensive testing and development work in these areas will lead to improvements in the design and construction of individual boiler components and a consequent improvement in overall boiler reliability.

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Maritime Administration

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199510
OPERATIONAL PERFORMANCE VERIFICATION OF ADVANCED GAS TURBINE TECHNOLOGY

Kaplan, SM

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Final Report, MA—RD—920—76036, Dec 31, 1975, 144pp

This final report encompasses all turbine testing—related efforts and detailed test data evaluations. The turbine was operated on washed, conditioned residual fuel oil at firing temperatures above 175 deg F for 871 hrs (743 of which were at or above 185 deg F). Test data evaluations indicate that all program objectives were met. MARAD Project developed technology and components under test were like—wise verified under this program.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, PB—251—087.

199511
EFFICIENT LOW—POWER OPERATION OF STEAM TURBINE MARINE POWER PLANTS

Femenia, J

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, NMRC—KP—140, Apr 1975, 25pp

As a result of recent large increases in the cost of fuel oil it has become necessary for ship operators to find ways of reducing fuel consumption. This Technical Memorandum describes and summarizes the results of a study undertaken at the Webb Institute of Naval Architecture, Center for Maritime Studies, to investigate possible fuel reduction measures. Five possible fuel saving techniques were investigated: propeller changes, turbine nozzle modifications, reduced pressure operation, use of cascading bleeds, and use of diesel—powered ship service generators. The report gives an evaluation of these techniques.

NTIS
Maritime Administration

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199514
MARINE GAS TURBINE APPLICATIONS MANUAL: VOLUME III

Kaplan, SM

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Economic Analysis, 75—GTD—22, June 1, 1975, 93pp

This document describes a part of the work performed within Task 8, Marine Systems Engineering and Analysis of the Heavy—Duty Gas Turbine Development Program, or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. The costs of this program are shared equally by the U.S. Department of Commerce, Maritime Administration and the General Electric Company, Gas Turbine Products Division. This document represents one of three volumes of the Task 8 Final Report. It presents Volume III, Economic Analysis, of the Marine Gas Turbine Applications Manual developed in this task. This specific volume covers gas turbine acquisition costs, installed cost, availability, and comparative economic analyses. The latter compares the economic viability of the gas turbine with steam turbine and diesel plants for three (3) illustrative vessels — a 60,000 DWT Panamax OBO, a 70,000 DWT bulk carrier and a 90,000 DWT tanker.

NTIS

Maritime Administration

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199515
MARINE GAS TURBINE APPLICATIONS MANUAL: VOLUME II: SHIP HEAVY—DUTY GAS TURBINE PROPULSION SYSTEMS INTEGRATION

Kaplan, SM

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Final Report, MA—RD—930—7605, June 1, 1975, 133pp

This document describes a part of the work performed within Task 8. Marine System Engineering and Analysis of the Heavy—Duty Gas Turbine Development Program or MARAD Project. The MARAD Project is an integrated effort to develop the heavy—duty gas turbine as an alternate competitive form of marine power generation. This document represents one of three volumes of the Task 8 Final Report and presents Volume Ship—Propulsion System Integration, of the Marine Gas Turbine Applications M anual Turbine Applications Manual developed in this task. This specific volume covers gas turbine installation and checkout, operational reliability and availability manning and skill levels, maintenance and typical marine gas turbine installations and total machinery space arrangements.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—75—11115.

199521
CNSG PRESSURE SUPPRESSION TEST PROGRAM: VOLUME I: EXPERIMENTAL AND ANALYTICAL WORK

Harrison, JF Wahle, HW

Babcock and Wilcox Company, Nuclear Power Generation Division, Lynchburg, Virginia 24505

Final Report, BAW—1404—Vol.I, Oct 1974

A model of the CNSG pressure suppression system was tested at four simulated ship attitudes (0, 45, 90 and 180 degrees) and for a range of other system variables. A total of 28 tests were conducted. Data from these tests were supplied to Nuclear Power Generation Division (NPGD) for model verification.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAW—1404—Vol.I.

199542
EVALUATION OF HEAVY—DUTY GAS TURBINE ELECTRIC DRIVE FOR "MAINE" CLASS ROLL ON/ROLL OFF CARGO SHIPS

Bath Iron Works Corporation, Bath, Maine

Summary Report, BIW—M—487, Jan 30, 1974, 27pp

The overall study objective was to develop preliminary designs and cost analysis for ships with both steam and several alternative gas turbine electric power plants which will demonstrate both the advantages and the problems of applying heavy—duty gas turbine electric drive propulsion systems to the "Maine" class roll on/roll off ship.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BIW—M—487.

199561
FEASIBILITY STUDY FOR CONCEPT 3 TUG (ARTUBAR TWINSCREW)

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, S—5455—3, July 9, 1973

The objective of this project was to check the technical feasibility of a design for an Artubar type twinscrew for propelling a 47,000 DWT barge at a service speed of 17 knots. The check was made on the basis of preliminary design sketches and calculations prepared only in sufficient depth to establish with reasonable certainty that the design is feasible and technically attainable.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5455—3.

199562
FEASIBILITY STUDY FOR CONCEPT 2 TUG (ARTUBAR SINGLESCREW)

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, S—5—5455—2, July 9, 1973

The objective of this project was to check the technical feasibility of a design for an Artubar type singlescrew tug for propelling a 47,000 DWT barge at a service speed of 18 knots. The check was made on the basis of preliminary design sketches and calculations prepared only in sufficient depth to establish with reasonable certainty that the design is feasible and technically attainable.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5455—2.

199563
FEASIBILITY STUDY FOR CONCEPT 1 TUG (MURVICKER TYPE)

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, S—5—5455—1, March 1, 1973

The objective of this project was to check the technical feasibility of a design for a Murvicker type tug for propelling a 47,000 DWT barge at a service speed of 18 knots. The check was made on the basis of preliminary design sketches and calculations prepared only in sufficient depth to establish with reasonable certainty that the design is feasible and technically attainable.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5455—1.

199576
HEAVY–DUTY MARINE GAS TURBINE DEVELOPMENT PROJECT (JUNE – SEPTEMBER 1973)

Kaplan, SM

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Progress Report, GTD–41–74, Oct 31, 1973, 145pp

This integrated development program for an improved marinized heavy–duty gas turbine has the following basic objectives: 1) high power outputs suitable for the largest merchant marine applications; 2) lower initial and operating costs when compared with current installations and 3) unrestricted Bunker "C" fuel burning capability. This project currently consists of the following six (6) interrelated technical tasks: 1) Operational Performance and Maintenance Improvements; 2) Turbine Cleaning; 3) Fuel Conditioning System Improvement; 4) Reversing Marine Gas Turbine Development; 5) Regenerator Improvement; and 6) Marine Systems Engineering and Analysis. This twelfth progress report covers the June 20 to September 20 period and essentially summarizes project activities for the third quarter of 1973. Steady progress has been made in all task areas during this report period.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number GTD–41–74.

199589
PRELIMINARY DESIGN ANALYSIS OF HELICAL CONSOLIDATED NUCLEAR STEAM GENERATOR TUBES

Chen, PY

Babcock and Wilcox Company, Research and Development Division, Alliance, Ohio

Interim Report, BAW–5166, Nov 1974, 37pp

The purpose of this phase of the tube support evaluation project was to analytically investigate the vibration characteristics of the helical Consolidated Nuclear Steam Generator (CNSG) tubes. Specifically, two objectives were accomplished: 1) determine analytically the tube natural frequencies and mode shapes as a function of tube support spacing and support condition; 2) determine the structural integrity of the assembly from a flow–induced vibration standpoint knowing the tube vibration response. The results are presented for the single span as well as the multiple span support condition. Flow–induced vibration of the tube bank was examined using vortex shedding and fluidelastic excitation theories. From a vortex shedding standpoint it was found that the structure would be adequate. A definite conclusion could not be made using the fluidelastic vibration theory. This should be investigated further in the experimental phases of this project.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BAW–5166.

199591
HEAVY–DUTY MARINE GAS TURBINE DEVELOPMENT (JUNE – SEPTEMBER 1972)

Pitrolo, AA

General Electric Company, Gas Turbine Products Division, Schenectady, New York 12345

Progress Report, GTF–41–74, 1972, 270pp

This integrated development program for an improved marinized heavy–duty gas turbine, has the following basic objectives: 1) high power outputs suitable for the largest merchant marine applications; 2) lower initial and operating costs when compared with current installations; and 3) unrestricted Bunker "C" fuel burning capability. This project consists of the following six (6) interrelated technical tasks: 1) Corrosion and Deposition; 2) Turbine Cleaning; 3) Fuel Treatment System Improvement; 4) Reversing Marine Gas Turbine Development; 5) Regenerator Improvement; and 6) Residual Fuel Washing Elimination. This ninth progress report covers the September 20 to December 20 period, and essentially summarizes project activities for the fourth quarter of 1972. Steady progress has been made in all task areas during this reporting period.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number GTD–41–74.

199595
MARINE CLOSED GAS TURBINE AND LNG REFRIGERATION SYSTEM STUDY: VOLUME I – CLOSED GAS TURBINE MARINE POWER SYSTEMS

Rackley, RA

AiResearch Manufacturing Company, Phoenix, Arizona 85034

Final Report, MA–RD–920–75003, June 30, 1974

A conceptual design study was conducted to develop a family of closed gas turbine engines satisfying many marine applications. Complete engine systems, including rotating group, heat exchangers, heat source, and control system were designed for both 9000 hp auxiliary electromechanical units, and small craft propulsion engines and also for 40,000; 60,000; and 80,000 hp helium cycle ship's propulsion engines. Further studies conducted revealed the closed gas turbine installations to offer definite economic advantages to the Maritime Industry, compared to steam, diesel or open cycle gas turbine plants. A second design study was conducted to analyze systems to control cargo boil–off from LNG tankers and to assess the impact of such systems on the economics of these tankers. Reliquefaction and subcooling approaches were considered using nitrogen–cycle reverse Brayton machines. Elimination of LNG boil–off was found to be feasible and economical provided the ratio of LNG cost to fuel oil cost was high.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA–RD–920–75003.

199613
EVALUATION OF TECHNIQUES FOR IMPROVING COMBUSTION ABOARD SHIPS: PART 1: MARINE BOILERS

Seaworthy Engine Systems, Incorporated, 73 Main Street, Essex, Connecticut 06426

MA–RD–920–77097, Feb 1978

This report describes the evaluation of ten (10) generic commercial fuel oil additives and two (2) fuel conditioning devices. Testing was performed aboard six (6) converted ex–"Mariner" class (C4–S–1a) containerships owned and operated by United States Lines. The report discusses the rationale for the chemical make–up of the various additives and the use of water–in–fuel emulsions in boilers. The products are ranked according to their effect on economy of boiler operation. Guidance is presented to assist the shipowner in using products similar to those evaluated. The comparative effects on boiler fouling and slag buildup are discussed in the format of boiler inspection reports.

NTIS
Maritime Administration

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199614
IMPROVED MARINE BOILER RELIABILITY: PHASE II: SUPERHEATER CORROSION RATES: VOLUME I

Roczniak, WR

Combustion Engineering, Incorporated, Marine Power Systems, Windsor, Connecticut 06095

June 1978, 179pp

This report presents the corrosion potential of commercially utilized superheater materials in a modern marine boiler under shipboard operating conditions. A comparison of wastage potential of several superheater materials over a selected temperature range was accomplished by the use of controlled temperature probes. Effect of exposure duration was determined by comparison of two identical probes removed from service at different time intervals. Several coatings were evaluated in this marine application. Physical measurements and chemical analysis of deposits and metallurgical techniques were used to develop the results generated by these probes. This information is intended for use in establishing safe operating temperatures for selected materials of fabrication.

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Maritime Administration

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199615
IMPROVED MARINE BOILER RELIABILITY: PHASE II: ECONOMIZER CORROSION RATES: VOLUME II

Roczniak, WR

Combustion Engineering, Incorporated, Marine Power Systems, Windsor, Connecticut 06095

MA—RD—920—77017, June 1978, 83pp

This report presents the corrosion potential of commercially available economizer materials in a modern marine boiler under shipboard operating conditions. A comparison of the wastage potential of economizer metals operating at normal temperatures and below acid dew point temperatures was accomplished by the use of controlled temperature probes. Physical measurements and metallurgical techniques were utilized to develop the results generated by these probes. This information can be used to establish safe operating temperatures and adequate materials of fabrication for the final stages of the economizer.

NTIS
Maritime Administration

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199616
IMPROVED MARINE BOILER RELIABILITY: BOILER WATER AND FEED WATER QUALITY MAINTENANCE: VOLUME VI

Powell, ST

Combustion Engineering, Incorporated, Marine Power Systems, Windsor, Connecticut 06095

MA—RD—920—78039, May 1978

This report summarizes Sheppard T. Powell Associates' review of current boiler water treatment practice followed by U.S. shipowners, crew personnel, boiler manufacturers and vendor—consultants, with an overview of this practice. It also describes the fundamental treatment programs needed for boiler water and evaporator treatment control, and the place for supplemental treatment chemicals in these programs. Current utility water treatment practice has been reviewed and commented on with respect to its future application in the marine field.

NTIS
Maritime Administration

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199617
IMPROVED MARINE BOILER RELIABILITY: SUPERHEATER AIR FLOW MODEL TESTS: VOLUME III

Bauver II, WP McGowan, JG

Combustion Engineering, Incorporated, Marine Power Systems, Windsor, Connecticut 06095

MA—RD—920—77018, April 1978

This report presents the results of a three dimensional cold flow model study of flow distribution in a marine superheater and the associated analytical work. Flow distribution in a marine superheater was determined as a function of physical characteristics and load conditions. Analytical flow distribution model was developed for simple one dimensional flow. A heat transfer program was developed to determine tube metal temperatures using the model flow distribution results. This work can be used to predict tube metal temperatures in superheaters for design purposes.

NTIS
Maritime Administration

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199622
A PRACTICAL OPERATING GUIDE FOR TUNING MARINE STEAM TURBINE PROPULSION SYSTEMS

Seaworthy Engine Systems, Incorporated, 73 Main Street, Essex, Connecticut 06426

Final Report, July 1978, 284pp

This manual presents procedures, recommendations, and guidelines for tuning marine steam turbine propulsion systems and related auxiliary components. Information relative to improving plant performance by optimized operation is included. Overall cycle performance analysis procedures are presented. Individual machinery component performance indicators have been identified. Penalties in excess fuel consumed due to operation in a degraded condition have been established. Component energy oriented problem cause, effect, and corrective action matrices have been provided along with various reference curves and typical performance data. The guide concludes with a section on maintenance and performance analysis of basic shipboard instrumentation types.

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199623
IMPROVED ATOMIZATION OF RESIDUAL FUELS FOR MARINE BOILERS: DEVELOPMENT OF FULL—SCALE ATOMIZATION MEASUREMENT TECHNIQUES: VOLUME I

Smith, DA LaFlesh, RC

Combustion Engineering, Incorporated, Marine Power Systems, Windsor, Connecticut 06095

Final Report, MA—RD—920—78073, Oct 1978, 144pp

This report is a summary of work performed on a project entitled Marine Boiler Atomizer Optimization Through Improved Atomizer Performance Measurement Techniques. The objectives of Task 1 include a state—of—the—art literature survey of twin fluid atomizer design and the effect of fuel properties on atomizer performance; the identification, design, and purchase of equipment required to perform droplet size and ballistics measurements using laser diffraction and double spark photographic measurement techniques; and the modification of an existing C—E full scale combustion test facility to accept the installation of a typical marine burner assembly. These objectives have been met and therefore allow progression to Task 2 work which includes marine boiler atomizer performance evaluation under non—combustion and combustion conditions using equipment developed under Task 1. Atomizer characterization carried out under Task 2 shall form the basis for improved atomizer designs to be tested under Task 3 of the project.

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199624
IMPACT OF INCREASED ASTERN POWER ON MARINE STEAM TURBINE PROPULSION SYSTEMS

Delaval Turbine, Incorporated, Turbine and Compressor Division, P. O. Box 251, Trenton, New Jersey 08602

Final Report, MA—RD—920—79006, Nov 1978

The objective of this technical study is the determination of the impact on the design, operation, performance and cost of conventional (non—reheat) steam turbine propulsion systems due to increased astern power requirements. Two approaches are followed: (a) improved astern turbine efficiency, and (b) increased astern steam flow. The study is applicable to new construction.

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199627
SHIPBOARD MAINTENANCE AND REPAIR SYSTEM — STEAM PLANT PROTOTYPE

Robinson, JB Kelly, RE Viele, JW

Prudential Lines, Incorporated, One World Trade Center, New York, New York 10048

MA—RD—920—79052, May 1979

This study describes the development and evaluation of a steam—turbine plant prototype of the Shipboard Maintenance and Repair System. The steam plant prototype was developed, installed, and evaluated on the LASH TURKIYE of Prudential Lines, Inc. The system is comprised on a program of preventive maintenance actions for the engineering plant, lighter crane and deck machinery, together with management aids for planning, scheduling, and recording maintenance, reporting casualties and repairs, requesting shore work, and maintaining inventory control of spare parts.

NTIS
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199639
EVALUATION OF A MODULAR HIGH—RPM DIESEL ELECTRIC SHIP PROPULSION PLANT

Stucky, CA Femenia, J

Webb Institute of Naval Architecture, Glen Cove, New York 11542

NMRC—KP—162, Oct 1978, 42pp

This report investigates methods of reducing marine power plant costs through the use of modular components. In this study a modular diesel electric plant was developed for a containership application and its economic aspects investigated in comparison with more conventional power plants. While the results of the study showed higher overall costs for the particular configuration and application selected, a detailed analysis of these costs revealed areas where improvements could realistically be attempted.

NTIS
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199652
STEAM PROPULSION CONTROL SYSTEM STUDY: PHASE I — THROTTLE CONTROL SYSTEM RELIABILITY IMPROVEMENTS: VOLUME I

American President Lines, 1950 Franklin Street, Oakland, California 94612

Final Report, MA—RD—920—78034, Dec 1978, 148pp

The Steam Propulsion Control System Study Phase I Final Report presents recommended modification alternative for improving the operational reliability of existing throttle control systems. The report examines throttle control system configurations for an electro—hydraulic system and an electro—pneumatic system as installed aboard U.S. Flag merchant vessels and an electro—hydraulic system of foreign manufacture which is considered to have high operational reliability. The development of the modification alternatives is described through a discussion of the failure history of existing throttle control systems and the priorities placed on these failures. The report concludes that some improvement in the operational reliability of throttle control systems could be realized by the implementation of some or all of the modifications on any particular vessel. Estimated cost of each modification is identified to enable each operator to make an evaluation of the cost effectiveness of these modifications in fleet operations. A program for further development of advanced centralized steam propulsion systems is proposed.

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199653
STEAM PROPULSION CONTROL SYSTEM STUDY: PHASE I — THROTTLE CONTROL SYSTEM RELIABILITY IMPROVEMENTS: VOLUME II

American President Lines, 1950 Franklin Street, Oakland, California 94612

Appendices, MA—RD—920—78034, Dec 1978, 129pp

The steam propulsion Control System Study Phase I Final Report presents recommended modification alternative for improving the operational reliability of existing throttle control systems. The report examines throttle control system configurations for an electro—hydraulic system and an electro—pneumatic system as installed aboard U.S. Flag merchant vessels and an electro—hydraulic system of foreign manufacture which is considered to have high operational reliability. The development of the modification alternatives is described through a discussion of the failure history of existing throttle control systems and the priorities placed on these failures. The report concludes that some improvement in the operational reliability of throttle control systems could be realized by the implementation of some or all of the modifications on any particular vessel. Estimated cost of each modification is identified to enable each operator to make an evaluation of the cost effectiveness of these modifications in fleet operations. A program for further development of advanced centralized steam propulsion systems is proposed.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—920—78034.

199667
APPLICABILITY OF COGAS MARINE POWER PLANTS FOR MERCHANT SHIPS

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, MA—RD—920—79017, Jan 1979

This report presents the results of a project investigating the commercial availability of equipment and the applicability of COGAS marine power plants for U.S. flag merchant ships. The report is subdivided into four parts and two appendices. Part I includes system optimization studies and a literature search. Various alternatives of steam cycles, heat recovery boiler pressures and efficiencies, steam turbine efficiencies and types of fuel are analyzed. Part II includes the work performed to develop the selected optimum steam cycle into a marine COGAS power plant. Part III is a technical bulletin including the design and performance of the COGAS power plant equipment. Part IV includes economic analyses comparing two U.S. flag ships, a containership and a tanker, fitted with steam and COGAS power plants. Appendix A contains the arrangement of machinery drawings of COGAS installations on a containership and a tanker; Appendix B the equipment drawings of COGAS power plant components.

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050825
IDENTIFICATION OF CODES, STANDARDS AND SAFETY REGULATIONS FOR PROPOSED LNG DEVELOPMENT AND TESTING LABORATORIES AT NMRC–GALVESTON

Laney, WM

National Maritime Research Center, Galveston, Texas 77550

Technical Report, NMRC–273–37000–R2, Aug 1973, 27pp

Safety regulations, codes and standards relevant to the design, construction and operation of a liquefied natural gas (LNG) development and testing laboratory proposed for the National Maritime Research Center–Galveston. The proposed laboratory will be used for research efforts in support of the Maritime Administration Program for the marine transportation of LNG.

NTIS

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130512
CRUDE WASHING GUIDELINES

Castaldi, G Powell, WJ

Exxon International Incorporated, New York, New York 10019

Interim Report, MA–RD–930–76012, Task 1, April 1975, 25pp

Equipment requirements for crude washing and operational guidance for planning and performing a safe, efficient operation with minimum vessel delay are discussed.

NTIS

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131859
HEAVY WEATHER DAMAGE WARNING SYSTEMS

Hoffman, D Lewis, EV

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, NMRC–KP–143, Sept 1975, 67pp

This report considers the nature of heavy weather damage on merchant ships and possible ways of avoiding such damage. A survey is given of commercially available instrumentation for providing warning to ship's officer that would be helpful to him in taking preventative action.

NTIS

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136231
FIRE–PROTECTION STUDY OF HIGH–PERFORMANCE SHIPS

Lugar, JR Rollhauser, CM

David Taylor Naval Ship R&D Center, Annapolis, Maryland 21402

MAT–75–46, Feb 1976, 86pp

A study was conducted on the problems associated with fires aboard high–performance ships. Basic ship layouts and descriptions were reviewed along with the present firefighting systems. Potential fire problems relating to construction materials, high fuel and payload capacities, gas turbines, and new habitability materials are discussed. Based on the study, it was determined that the state–of–the– art in fire detection and passive fire protection does not offer complete solutions to the fire threat. Present firefighting systems are considered inadequate to combat large fires or fires caused by hostile attack. No backup systems are provided if the existing Halon 1301 system fails to extinguish fires in the machinery spaces. Water is not readily available to combat class A fires throughout the ships.

NTIS

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139927
FEASIBILITY STUDY FOR THE DEVELOPMENT AND USE OF THE SATELLITE COMMUNICATIONS SYSTEM TO PROVIDE SHIPBOARD EMERGENCY MEDICAL SERVICE

National Maritime Research Center, Kings Point, New York 11024

1976

Assesses the current quality of shipboard medical care, and proposes a program for improving this care through the use of specialized training and new communication systems such as the maritime satellite.

NTIS

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142318
NATURE OF SHIP COLLISIONS WITHIN PORTS

Warwick, JE Anderson, AL

Todd Shipyards Corporation, Galveston, Texas 77553

NMRC–336–40000–R1, April 1976, 30pp

This report is a summary of the nature of ship collisions which have occurred in ports or while in the protected waters enroute to port and is based on information obtained for ship operations in seven representative U.S. ports over a five year period. In addition to the collisions which have occurred, port traffic information for the same time period is included.

Maritime Administration

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143647
BULK CARRIER OPERATIONS SAFETY ENHANCEMENT PROJECT. PHASE I

Bass, RL Owen, TE Dodge, FT

Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas 78284

MA/RD–920–76057, 237pp

Appropriate scale modeling methods for studying liquid petroleum cargo shiptank electrostatics, washing and atmosphere control phenomena are established and evaluated. A review of currently available full and

model scale study data and implications of this data in view of the developed modeling criteria are presented. Recommended laboratory studies in the areas of atmosphere control, tank washing and electrostatics are discussed with emphasis on the utilization of additional laboratory data supplementing current knowledge to develop definitive design and operation guidelines.

NTIS

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148177
HYDROGEN SUPPRESSION STUDY AND TESTING OF HALON 1301— PHASES I AND II

McHale, ET

Atlantic Research Corporation, Alexandria, Virginia 22314

MA—RD—920—77035, 7411—7612, Dec 1976

In the event of a loss—of—coolant—accident in the reactor to be used to power nuclear ships, it can be postulated that sufficiently high concentrations of H2 and O2 might develop that a resulting explosion would produce overpressures that exceed the containment design. If a LOCA occurred and the H2 concentration reached the explosive limit, an inerting gas could be discharged into the containment to suppress any possible explosion. This report describes a study that was conducted to evaluate the feasibility of employing Halon 1301 in an explosion suppression system for a maritime nuclear reactor. One experimental task involved measuring the quantity of agent required to inert H2, O2, N2 mixtures over a range of conditions likely to be encountered in a containment. In another task, a facility was assembled which simulated a containment vessel on subscale. Several tasks were addressed to technical problems that could be envisioned if Halon were present in a containment vessel. The results of the study support the concept of using Halon 1301 for containment protection.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—920—77035.

154037
STUDY OF THE PERMEABILITY OF CARGO SHIPS. VOLUME I. TEXT

Mallett, DT

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, 5590, Vol—1, Nov 1976, 34pp

Information and data for use in selection of values of permeability for machinery spaces of modern steam—propelled cargo ships, and for permeability in cargo spaces of modern container ships and barge carrying ships were developed. The work consisted of permeability calculations and some observations in the field.

NTIS

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154038
STUDY OF THE PERMEABILITY OF CARGO SHIPS. VOLUME II. APPENDICES

Mallett, DT

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, 5590, Vol—2, Nov 1976, 215pp

Contents: Floodable volume calculations for barges; Barge utilization and permeability; Memorandum re—barge loading inspection; Breakdown of weights and volumes of machinery for three sample ships; Summary of engine room components, weight and volume calculations; Memorandum re—cargo permeabilities; East Coast commodity container utilization; Memorandum re—container loading inspection.

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154576
INSTALLATION, TEST AND EVALUATION OF THE DESTATOR. A DEVICE TO ENHANCE THE OPERATIONAL SAFETY AND PERFORMANCE OF BULK PETROLEUM CARRIERS

Cincotech Corporation, Beverly Hills, California

Final Report, MA/RD—920—76053, Nov 1976, 245pp

At—sea test results are presented of a device (Destator) for enhancing the operational safety of bulk petroleum carriers. Described are the test program formulation, the intrinsic safety certification program, the equipment description and the installation. Also presented are the at—sea test descriptions and results in both a clean gas—free as well as dirty—inerted environment.

NTIS

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154585
GROUNDING PROBABILITY STUDIES

Minorsky, VU

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

MA—RD—920—77041, 78pp

Grounding statistics for vessels over 6000 G.T. were compiled for the 6 years 1970—1975. Results were analyzed for tankers and non—tankers, each in four gross tonnage groups as to location, cause, and result. Groundings were studied in detail on proposed nuclear vessel routes with an approximate calculation of casualty probability based on route casualties and ship traffic flow. Recommendations are given to help reduce the frequency of groundings for the nuclear vessels.

NTIS

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155087
STUDY OF COLLISION CHARACTERISTICS

Zahn, AS

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

5570—1, 42pp

Data on the details of 134 collisions were collected from the files of IMCO and USCG from 1944 to 1975. Cases are identified by number or name, flag, type, tonnage and characteristics. Information lists repair costs, location of casualty, weather, cause of collision, ships speeds and angle of impact with diagram, damage location, description, length, height, and depth.

NTIS

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155088
GROUNDING CHARACTERISTICS AND EFFECTS

Zahn, AS

Maritime Administration, Washington, DC 20230

5570—5, 23pp

Data on the details of 52 groundings were collected from the files of IMCO and USCG from 1944 to 1975. Cases are identified by number or name, flag, type, tonnage and characteristics. Information lists repair costs, location of casualty, weather, cause of grounding, speed of impact, information on double bottom condition; damage location, description, length, width and depth; also type of sea bottom.

NTIS

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155089
STUDY OF COLLISION EFFECTS

Minorsky, VU

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

5570—2, 32pp

Statistics for casualties to ships over 2000 gross tons are given for 1975 and added, in the case of collisions, to previous statistics for the years 1964—1974, so as to give collision—derived casualties. These are differentiated for tanker and non—tanker types, and depending on whether the ship was the struck or striking vessel. The main findings are that about one—fifth of struck non—tankers sink as the result of a collision, and about one—third of struck tankers catch fire or explode.

NTIS

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168274
GROUNDING CHARACTERISTICS AND EFFECTS

Zahn, AS

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, 28 Jan 1977, 23pp

Data on the details of 52 groundings were collected from the files of IMCO and USCG from 1944 to 1975. Cases are identified by number or name, flag, type, tonnage and characteristics. Information lists repair costs, location of casualty, weather, cause of grounding, speed of impact, information on double bottom condition; damage location, description, length, width and depth; also type of sea bottom.

NTIS

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168788
EVALUATION OF CAPACITANCE DENSITOMETRY FOR LNG MIXTURES WITH LOW NITROGEN COMPOSITION

Giarratano, PJ Collier, RS

Maritime Administration, Washington, DC 20230

Final Report, 1977, 7pp

Densities of typical LNG mixtures under saturation and subcooled conditions were calculated using a computer program which uses the method of corresponding states. The dielectric constant for each mixture was determined from the Clausius—Mosotti relationship assuming the excess CM function is zero. Examination of the resulting density—dielectric constant plots shows that for fixed nitrogen composition a nearly linear relationship exists between saturation density and dielectric constant under isobaric or isothermal conditions, independent of the hydrocarbon mixture. The results show, however, that the effect of the nitrogen composition on this linear relationship may be taken into account partially by a measurement of the mixture temperature. For the range of mixtures of this study it is possible to determine density to + or — 0.3% independent of knowledge of the hydrocarbon composition from an exact measurement of dielectric constant and temperature. Further improvements can be made if the fraction of nitrogen is known.

NTIS

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169605
DEVELOPMENT OF ACCIDENT EVENT TREES AND EVALUATION OF SAFETY SYSTEM FAILURE MODES FOR THE NUCLEAR ULTRA LARGE CRUDE CARRIER (ULCC)

Coffey, RS Goodwin, EF Lewe, CK Maltese, JG Pyatt, DW

NUS Corporation, 4 Research Place, Rockville, Maryland 20850

NUS—1845, 167pp

Various ship accidents which have the potential of causing damage to the nuclear power systems of the nuclear powered Ultra Large Crude Carrier (ULCC) are identified. For each ship accident, an event tree is developed which shows the possible causal relationship between ship accident and derangement of nuclear safety—related systems. System state diagrams are developed which define the degree of availability of each safety—related system. As an example of the use of the methodology, availability state tables are derived for each safety—related system for all potential results of a collision accident. Further, an analytic set of probability equations are derived relating the probability of loss—of—function, either partial or complete, of the low pressure safety injection system to the various consequences of a collision.

NTIS

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177239
PROBABILITY OF COLLISIONS ON SELECTED ROUTES. VOLUME I

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

MA—RD—92077021, V1, Sept 1976, 48pp

Lifetime collision probability on two nuclear tanker routes and one nuclear container route were calculated based on route collision frequency obtained from the Liverpool Underwriters' Casualty Returns for an eleven—year period and a route density projection to 1990. A model was obtained for the probability of collision on a given route for the lifetime of a nuclear vessel. Sensitivity studies were made for variations in nuclear ship speed, speed of other vessels, and average density of ships in a given grid square of ocean.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—261664/7ST.

181227
PROPOSED SINKING TESTS (ULCC) TASK IV

Minorsky, VU

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

MA—RD—920—78041, 36pp

A report of a previous sinking test performed in 1971 in Hamburg, Germany was translated, and studied. It is appended. It is recommended that the test model be made only for the stern of the tanker and be made of transparent plastic so as to monitor the entrapped air; it is also recommended that the velocity and attitude of the sinking model be recorded only by camera. A list of U.S. Model tanks suitable for this test and a rough cost estimate are given.

NTIS

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199441
REPORT ON PROBABILITY OF COLLISIONS ON SELECTED ROUTES: VOLUME I

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, MA—RD—920—77021, Sept 30, 1976, 48pp

Lifetime collision probability on two nuclear tanker routes and one nuclear container route were calculated based on route collision frequency obtained from the Liverpool Underwriters Casualty Returns for an eleven year period and a route density projection to 1990 performed by Planning Systems Inc. In calculating the probability the methodology developed in Ref. 7 was used to get the number of vessels to be found in a circular area of encounter travelling with the nuclear vessel. A model was obtained for the probability of collision on a given route for the lifetime of a nuclear vessel. Sensitivity studies were made for variations in nuclear vessel speed, speed of other vessels, and average density of ships in a given grid square of ocean, but not for the number of collisions per unit time in such grid square.

NTIS
Maritime Administration

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199450
FIRE/EXPLOSION PROBABILITY STUDY

Mallett, DT

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, S—5—5570—3, Nov 4, 1976, 100pp

Statistics for Fires and Explosions on board ships over 2,000 g.t. were compiled for 1970 through 1975 inclusive. Results are given for tankers and non—tankers, loaded or in ballast, in port or at sea. Statistics also list the location and cause of the fire/explosion. A special list was compiled for vessels over 60,000 g.t. The probability of fire/explosion is calculated for tankers, container ships and non—tankers. Statistics are given for tankers with an inert gas system approved by Lloyds. Recommendations are given to help reduce the occurrences of fires/explosions.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5570—3.

199572
SPECIFICATION FOR A HIGH RELIABILITY SHIP STRESS RECORDER

Lockheed Shipbuilding and Construction Company, Seattle, Washington

Final Report, LSCC—3838—ANN—C—3, March 1974, 32pp

The report describes a ship stress recorder system consisting of four primary elements: 1) stress transducer assembly (strain gages) attached to the ship structure; 2) signal transmission system; 3) data processor (up to 16 separate data inputs); and 4) digital tape recorder.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number LSCC—3.838—ANN—C—3

199605
COST—EFFECTIVENESS OF MARINE FIRE PROTECTION PROGRAMS

Oppenheimer, KR Alger, RS Martin, SB McNamee, PC Offensend, FL

SRI International, 333 Ravenswood Avenue, Menlo Park, California 94025

Final Report, SRI—Proj.6648, Nov 1978, 211pp

This report presents the results of a cost—effectiveness study of alternative marine fire protection programs. It includes an estimate of current and future marine fire losses and a comparison of the cost—effectiveness of programs designed to reduce these losses.

Maritime Administration

This document is available for review at the Departmentof Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number SRI—proj.6648.

199618
BULK CARRIER OPERATIONS SAFETY ENHANCEMENT PROJECT: SHIPTANK ELECTROSTATIC MODEL STUDIES: VOLUME II

Owen, TE Spiegel, RJ

Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas 78284

MA—RD—920—78072, Oct 1978

Shiptank Electrostatic Model Studies presents experimental electrostatic results from laboratory scale model ship tank washing and liquid sloshing tests using fresh water, seawater and crude oil liquids. Geometric scaling law relationships based on a linear theoretical description of the electrical phenomena are experimentally confirmed to provide potential means for extrapolating laboratory test results to full scale tank enclosures. Electrostatic model study results are summarized to provide general technical guidelines for shiptank design and operational factors related to electrostatic hazard reduction. Electrostatic instrumentation and numerical computer models developed especially for the scale model laboratory tests are described and documented.

NTIS
Maritime Administration

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199619
BULK CARRIER OPERATIONS SAFETY ENCHANCEMENT PROJECT: PHASE II: TANK ATMOSPHERE CONTROL: VOLUME I

Bass, RL Morrow, TB

Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas 78284

Final Report, MA—RD—920—78071, Oct 1978, 215pp

An experimental study was conducted utilizing scale modeling techniques to establish improved methods for shiptank gas freeing and inerting. Scaling studies were performed to establish appropriate similitude criteria. Parametric studies were undertaken to investigate the effects of tank internal geometries, inlet/outlet configurations and locations, blower flow capacities, and gas densities on the gas exchange process. A comprehensive set of experiments was conducted on six shiptank models which represent extremes in tank geometry for U.S. designed and constructed ships. Design and operational information is presented and techniques to improve the efficiency of gas exchange are recommended for both dilution and displacement methods.

NTIS
Maritime Administration

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043207
STANDARD SPECIFICATIONS FOR MERCHANT SHIP CONSTRUCTION

Maritime Administration, Washington, DC 20230

Final Report, MA—SC—720—73008, Dec 1972, 501pp

The MarAd Standard Specifications for Merchant Ship Construction are intended to provide guidance to the maritime industry for the preparation of detailed ship specifications. They are complete in all aspects of required contract work and embody the following pertinent features: Establish levels of quality as a bench mark for Construction Differential Subsidy; Identify current requirements of regulatory bodies; Reflect latest technological developments; Indicate measures of standardization to encourage mass production techniques; and, Include standard text to reflect legal aspects of contract work.

Maritime Administration

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044636
RELATIVE COST OF SHIPBUILDING. A REPORT TO THE CONGRESS ON THE RELATIVE COST OF SHIPBUILDING IN THE VARIOUS COASTAL DISTRICTS OF THE UNITED STATES

Newman, CV

Maritime Administration, Washington, DC 20230

MA—STAT—722—73015, 7106—7206, June 1972, 35pp

The report is submitted annually to the Congress under Section 213 of the Merchant Marine Act of 1936 as amended. The report details the relative cost of construction or reconditioning of comparable ocean vessels in shipyards in various coastal districts of the U.S.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, Microfiche $1.45 COM—73—50168.

047751
MARITIME ADMINISTRATION TANKER CONSTRUCTION PROGRAM

Maritime Administration, Washington, DC 20230

Final Report, ELR—0725, May 1973, 397pp

Because of the present demand for imported energy products and projected increase in such imports, an important segment of the 1970 Program involves the subsidized construction of liquid bulk carriers or tankers for operation in U.S. foreign trade. This part, the Tanker Program, involves the construction of a mix of tank vessels including handy size tankers, intermediate size tankers, supertankers, jumbo supertankers, and combination ore/bulk/oil carriers (up to 160,000 DWT). The Tanker program is the subject of the statement. This section describes the major elements of the marine environment air, water, and land affected by the construction and operation of the tank vessels. Environmental impact will occur throughout the marine environment, including landward areas, coastal zone and coastal ocean areas and the open oceans lying within the prescribed trade routes for the ships. The statement also considers the amounts of oil pollution, operational and accidental, that may be discharged from the vessels.

Maritime Administration

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050824
ANALYSIS OF DRYDOCK OPERATIONS DURING NORMAL MAINTENANCE AND INSPECTION OUTAGES

Lawder, WH

National Maritime Research Center, Galveston, Texas 77550

Technical Report, NMRC—272—22000—R1, June 1973, 56pp

This report, developed at the National Maritime Research Center at Galveston, Texas, reviews reasons for drydocking ships, basic types of drydocks in current use, and the process of drydocking a U. S. vessel in a commercial floating drydock in an American Shipyard. A normal underwater inspection procedure conducted for mandatory periodic survey by the United States Coast Guard and the American Bureau of Shipping, is described and comments made on problems encountered in preparation for inspection, recoating, and repairs made to satisfy the Coast Guard and National Bureau of Standards. In view of the ever—increasing size of modern ships and the consequent increased cost of drydocking these ships, this report identifies major problems associated with drydocking and proposes areas of study by Marad to eliminate or minimize these problems.

NTIS

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127441
RESEARCH ON COMPUTER APPLICATIONS TO SHIPBUILDING. VOLUME I. FINAL REPORT

Franzetti, E

Avondale Shipyards, Incorporated, New Orleans, Louisiana

Final Report, MA—RD—930—75069Vol—1, May 1975, 65pp

This report contains the results of a survey of the computer capabilities of the U.S. shipbuilding industry. It also contains an index or catalog of existing computer programs which are presently being used by the industry. The report identifies areas that are lacking in computer programming and makes recommendations as to what course of action should be taken in these areas.

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127581
ONE SIDE WELDING—FLUX DEVELOPMENT—AND STUDY OF MULTIPLE ARC BEHAVIOR

Brayton, B

Bethlehem Steel Corporation, Sparrows Point, Maryland

Project Report, MA—RD—930—75073, June 1974, 128pp

The report contains the results of a project to develop a one sided welding capability, in a U.S. shipyard, on steel up to 1—1/2 inch thick. The project developed the necessary flux and the proper control of arc behavior with separately powered arcs that would provide satisfactory welds in steels up to 1—1/2 in. thick.

NTIS

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143348
CRUDE WASHING

Powell, WJ

Exxon International Incorporated, New York, New York 10019

MA/RD—940—76056, 143pp

Crude washing is the process of washing the tanks of crude carriers during cargo discharge, using the cargo as the washing fluid. This report summarizes tests conducted to determine the effectiveness of crude washing. It concludes that crude washing is a viable technique for reducing operational pollution in normal ballast handling and sludge removal operations.

NTIS

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146274
MARITIME AND CONSTRUCTION ASPECTS OF OCEAN THERMAL ENERGY CONVERSION (OTEC) PLANT SHIPS — DETAILED REPORT

Avery, WH Blevins, RW Dugger, GL Francis, EJ

Applied Physics Laboratory, Johns Hopkins Road, Laurel, Maryland 20810

MA—RD—940—T76074, 232pp

A very promising way to alleviate the nation's energy problems, one that would greatly affect United States maritime activities, would be the rapid development of Ocean Thermal Energy Conversion (OTEC) plant—ships to produce energy—intensive products at sea. Such OTEC plant—ships would use the temperature difference between the warm surface layer and the cold deep layers of a tropical ocean to drive a heat engine to produce electric power that, in turn, would be used to produce ammonia, aluminum, liquid hydrogen, and/or other products. The construction, deployment, operation, and shipping support of these plant—ships are discussed.

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151314
SHIPYARD WELDING — TOUGHNESS EVALUATION OF ELECTROGAS AND ELECTROSLAG WELDMENTS

Alia, BL Brayton, WC

Maritime Administration, Washington, DC 20230

Final Report, MA—RD—920—77038, 1974, 134pp

A report is made on the results of a project which evaluated the toughness of Electroslag and Electrogas Weldments as compared to other welding processes such as manual metal arc and submerged metal arc. The results indicate several areas in ship construction where present limitation on the use of high—heat input welding, such as electrogas/electroslag, may be relaxed.

NTIS

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151315
SHIPYARD WELDING AND CUTTING — PLASMA PROCESSES OF CUTTING AND WELDING

Brayton, WC Hogan, JA

Bethlehem Steel Corporation, Sparrows Point, Maryland

Final Report, MA—RD—920—77039, Feb 1976, 85pp

The report analyzes the latest developments in plasma arc cutting, welding and shape cutting machines with emphasis on their application in the shipbuilding industry. Plasma welding was found advantageous over other welding processes for only a very few shipyard requirements. Plasma cutting, on the other hand, is shown to be ideally suited for the productivity, quality and operating cost necessary in modern shipbuilding.

NTIS

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151316
SHIPYARD WELDING — DEVELOPMENT OF EXTENDED LENGTH, CONTINUOUS WIRE FEED SYSTEMS

Brayton, WC Troyer, W

Maritime Administration, Washington, DC 20230

Final Report, MA—RD—920—77037, May 1974, 127pp

The report describes the results of a project for the development of a semiautomatic welding system with appropriate hardware which permits an operator to weld over 200 feet from the power supply and wire source while still providing the flexibility comparable to that of manual welding with stick electrodes.

NTIS

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158247
FEASIBILITY OF UNITED STATES FLAG HEAVY LIFT SHIPPING. VOLUME 1. SUMMARY

Andrews, BV

Lykes Brothers Steamship Company, Incorporated, 300 Poydras Street, New Orleans, Louisiana 70130

Final Report, MA/RD—940—77063, Jan 1977, 29pp

This report briefly summarizes the technical report and appendices. The study described the demand for shipping of heavy lift units, defined as over 100 tons, or 80 ft length, or 15 ft width. Small ships for lift, float and roll cargo handling, conversions of general cargo liners by adding lift derricks and midbodies and tugs pulling barges for roll on—off were designed and costs estimated. Regulatory and subsidy constraints expected were defined. Voyages of ten vessels carrying typical shipments were simulated to evaluate performance of alternative systems. Converted U.S. liners appeared to be most profitable, if not diverted far, providing the desired service except for the largest units. Other craft are also evaluated.

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166759
NUCLEAR POWERED TANKER. MARITIME DESIGN STUDY FOR 600,000 DWT NUCLEAR TANKER. VOLUME 1. PRELIMINARY SPECIFICATIONS (MOD 1)

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

1010—M/1, Vol—1, 505pp

The study extended over a period of approximately six months. The principal objectives of the study were to develop the preliminary design for a 600,000 DWT nuclear powered ULCC, perform ship safety analyses, develop a preliminary quality assurance program, develop a ship construction schedule of key events, develop the shipyard/reactor manufacturer scope of supply, define the interfaces specifically related to the nuclear propulsion plant. In terms of budgetary estimates, an economic evaluation was performed for ship construction cost, ship refueling and drydocking cost, first of a kind ship construction cost, ship manning cost, and contingencies. Additionally, recommendations are made as a result of the ship safety studies.

NTIS

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166760
NUCLEAR POWERED TANKER. MARITIME DESIGN STUDY FOR 600,000 DWT NUCLEAR TANKER. VOLUME 2. PRELIMINARY DESIGN

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

1010—M/1, Vol—2, 236pp

The study extended over a period of approximately six months. The principal objectives of the study were to develop the preliminary design for a 600,000 DWT nuclear powered ULCC, perform ship safety analyses, develop a preliminary quality assurance program, develop a ship construction schedule of key events, develop the shipyard/reactor manufacturer scope of supply, define the interfaces specifically related to the nuclear propulsion plant.

NTIS

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166761
NUCLEAR POWERED TANKER. MARITIME DESIGN STUDY FOR 600,000 DWT NUCLEAR TANKER. VOLUME 3. SHIP SAFETY

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

1010—M/1, Vol—3, 379pp

The study extended over a period of approximately six months. In terms of budgetary estimates, an economic evaluation was performed for ship construction cost, ship refueling and drydocking cost, first of a kind ship construction cost, ship manning cost, and contingencies. Additionally, recommendations are made as a result of the ship safety studies.

NTIS

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166762
NUCLEAR POWERED TANKER. MARITIME DESIGN STUDY FOR 600,000 DWT NUCLEAR TANKER. VOLUME 4. ENGINEERING AND PRODUCTION SUPPORT

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

1010—M/1, Vol—4, 170pp

The study extended over a period of approximately six months. The principal objectives of the study were to develop the preliminary design for a 600,000 DWT nuclear power ULCC, perform ship safety analyses, develop a preliminary quality assurance program, develop a ship construction schedule of key events, develop the shipyard/reactor manufacturer scope of supply, define the interfaces specifically related to the nuclear propulsion plant.

NTIS

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166763
NUCLEAR POWERED TANKER. MARITIME DESIGN STUDY FOR 600,000 DWT NUCLEAR TANKER. VOLUME 5. ECONOMIC EVALUATION

Newport News Shipbuilding & Drydock Company, Newport News, Virginia 23607

1010—M/1, Vol—5, 128pp

The study extended over a period of approximately six months. The principal objectives of the study were to develop the preliminary design for a 600,000 DWT nuclear powered ULCC, perform ship safety analyses, develop a preliminary quality assurance program, develop a ship construction schedule of key events, develop the shipyard/reactor manufacturer scope of supply, define the interfaces specifically related to the nuclear propulsion plant. In terms of budgetary estimates, an economic evaluation was performed for ship construction cost, ship refueling and drydocking cost, first of a kind ship construction cost, ship manning cost, and contingencies.

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199319
SHIPBUILDING ALIGNMENT WITH LASERS

Chirillo, L

Todd Shipyards Corporation, Seattle, Washington

Final Report, MA—RD—930—75071, Apr 1974, 117pp

The objective of this manual is to present actual experience in applying lasers for shipbuilding alignment and to identify areas where lasers could be advantageous over other systems for either alignment or measurement. This manual also provides guidance with which to select and specify lasers that serve suggested applications. Moreover, it provides sufficient knowledge for someone already experienced in alignment techniques to adapt lasers to existing procedures and to implement new procedures.

NTIS
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199321
COST EFFECTIVENESS STUDY OF WEATHER PROTECTION FOR SHIPBUILDING OPERATIONS: VOLUME I

Chirillo, L

Todd Shipyards Corporation, Seattle, Washington

Final Report, MA—RD—930—75074, April 1974, 75pp

This report contains data on how weather factors impact adversely on the shipbuilding process. It is comprehensive, not intended for the casual reader, and useful for the purpose of quantifying losses due to weather. It can serve management to determine how much money should be invested in weather protection devices.

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199322
COST EFFECTIVENESS STUDY OF WEATHER PROTECTION FOR SHIPBUILDING OPERATIONS: VOLUME II

Chirillo, L

Todd Shipyards Corporation, Seattle, Washington

Final Report, MA—RD—930—75074, Apr 1974, 254pp

This report contains data on how weather factors impact adversely on the shipbuilding process. It is comprehensive, not intended for the casual reader, and useful for the purpose of quantifying losses due to weather. It can serve management to determine how much money should be invested in weather protection devices.

NTIS
Maritime Administration

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199346
THE ORGANIZATION OF SHIPBUILDING RESEARCH ABROAD AND IN THE UNITED STATES

Mack—Forlist, DM Lewis, EV

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, MA—RD—900—7401, Apr 1973, 107pp

The report presents a survey of shipbuilding research associations in Europe and Japan and a qualitative evaluation of their effectiveness. The organization of U.S. shipbuilding industry is then surveyed and research needs outlined on the basis of shipyard interviews and a questionnaire. The authors recommend that high priority be given to management techniques and to personnel motivation and training. It is recommended that the present cooperative shipbuilding research program in the U.S. be strengthened by creating a senior central group or Shipbuilders' Research Association to work with R and D sponsors.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—73—11047.

199386
IMPROVED PLANNING AND PRODUCTION CONTROL: NATIONAL SHIPBUILDING RESEARCH PROGRAM: VOLUME I

Bath Iron Works Corporation, Bath, Maine

Executive Summary, BIW—3—N—TASK 0—2—Vol.I, May 1977

This report examines factors such as time, schedules, standards, and budgets in order to reduce the cost of building ships in U.S. shipyards

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BIW—3—N—TASK 0—2—Vol.I.

199437
AUTOMATIC PAINTING OF STRUCTURAL STEEL SHAPES

Thorell, LM Rudlouski, G

General Dynamics Corporation, Quincy, Massachusetts

Final Report, MA—RD—920—77032, 1973, 39pp

Because of the large variety of sizes and configurations of structural shapes used in U.S. shipbuilding, there has been limited development of an automatic paint facility for this operation. This report describes a prototype—automatic paint facility developed under this project which is capable of coating all shapes used in shipbuilding. It can also handle special or otherwise unusual shapes with minor modifications.

NTIS
Maritime Administration

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199451
ECONOMIC IMPACT OF THE U.S. MERCHANT MARINE AND SHIPBUILDING INDUSTRIES: AN INPUT—OUTPUT ANALYSIS

Port Authority of New York and New Jersey, Planning and Development Department, New York, New York

Final Report, MA—GEN—970—78004, May 1977, 272pp

The report focuses on economics, using the input—output model which has become one of the most powerful tools of economics. The report demonstrates that the U.S. merchant marine and shipbuilding industries are vital economic assets to this nation's productive output.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, PB—272—518.

199466
TRANSPORT ANALYSES — GREAT LAKES AND SEAWAY: VOLUME II: INTRALAKE TRADE

Stallone, BJ Beyer, CF

Department of Naval Architecture and Marine Engineering, University of Michigan, Ann Arbor, Michigan

Final Report, MA—RD—930—75051, Jan 1975, 98pp

This volume deals with mine—to—blast furnace transport cost, optimization of fleet make—up, and modeling of ships through ice—congested areas with icebreaker assistance. The mine—to—blast furnace analysis explaines how to predict all the elements of cost in the complete transport system. Also, there is an analysis of the problem of how best to carry raw materials to steel mills on confining rivers that preclude service by the newer, larger ships. The description of the fleet optimization method shows how the benefits of winter navigation are maximized through the rational scheduling of ships for the winter lay—up. In the last chapter, the modeling of ships through ice—congested areas is performed with a GPSS computer model of the system.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—75051.

199467
QUALITY ASSURANCE GUIDELINES

Thomson, WG

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—274—44030—R1, Jan 1975, 76pp

This report presents minimum testing requirements for assurance of meeting desired quality requirements in nuclear ship construction. It identifies the major groups involved, delineates their responsibilities, briefly describes the tests, and tabulates the minimum testing required for each item.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—274—44030—R1.

199528
SHIPBUILDING INDUSTRY & MARITIME ADMINISTRATION SHIP PRODUCIBILITY PROGRAM, TASK S—4, ADVANCED PIPE TECHNOLOGY STUDY

Bath Iron Works Corporation, Bath, Maine

Executive Summary, BIW—3—N—Task S—4, 1977, 17pp

This project examines in detail almost every activity that is directly involved in the overall piping process, which includes piping design/engineering, piping fabrication, and piping assembly/installation.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BIW—3—N—Task S—4.

199635
A SHIP REPAIR MARKET ASSESSMENT: MARKET ANALYSIS 1967—1990

McCaul, JR Phillips, SW

International Maritime Associates, Incorporated, 1800 K Street, NW, Washington, DC 20006

MA—RD—940—79005, Sept 1978

The changing industrial environment in ship repair — not only in the U.S. but worldwide — has been influencing the shape and size of the U.S. industry. The report is an attempt to review the industrial situation over the last decade to better assess the character of the industry at the present time. It also forecasts the potential market for the industry in the next decade and offers some recommendations which would lead to a stronger ship repair environment in the future. The report is oriented more toward market analysis than it is toward describing the mere workings of the industry. Subjects such as facilities utilization, employment, productive efficiency, etc. are covered only as they bear on an understanding of the world and domestic markets for ship repair companies.

NTIS
Maritime Administration

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199636
A SHIP REPAIR MARKET ASSESSMENT: MARKET ANALYSIS 1967—1990

McCaul, JR Phillips, SW

International Maritime Associates, Incorporated, 1800 K Street, NW, Washington, DC 20006

Executive Summary, MA—RD—940—79004, Sept 1978, 17pp

The changing industrial environment in ship repair — not only in the U.S. but worldwide — has been influencing the shape and size of the U.S. industry. The report is an attempt to review the industrial situation over the last decade to better assess the character of the industry at the present time. It also forecasts the potential market for the industry in the next decade and offers some reccomendations which would lead to a stronger ship repair environment in the future. The report is oriented more toward market analysis than it is toward describing the mere workings of the industry. Subjects such as facilities utilization, employment, productive efficiency, etc. are covered only as they bear on an understanding of the world and domestic markets for ship repair companies.

NTIS
Maritime Administration

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199640
SPARE PARTS PROVISIONING STUDY

Mystech Associates, Incorporated, P. O. Box 220, Mystic, Connecticut 06355

Final Report, MA—RD—920—79068B, Sept 1979

This study presents the results of an assessment of the scope of spare parts provisioning, utilization, and control within the maritime industry. It encompasses both a qualitative and quantitative assessment of spare parts requirements for a typical merchant ship, and includes prevailing maritime industry practices regarding spare parts identification, procurement, inventory, control, and centralized warehousing and pooling.

NTIS
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199641
SPARE PARTS PROVISIONING STUDY – REQUIREMENTS ASSESSMENTS OF AN INDUSTRY WIDE INTEGRATED SUPPLY SYSTEM

Mystech Associates, Incorporated, P. O. Box 220, Mystic, Connecticut 06355

MA–RD–920–79068C, Sept 1979

This study presents the results of an assessment of the scope of spare parts provisioning, utilization, and control within the maritime industry. It ecompasses both a qualitative and quantitative assessment of spare parts requirements for a typical merchant ship, and includes prevailing maritime industry practices regarding spare parts identification, procurement, inventory, control, and centralized warehousing and pooling.

NTIS
Maritime Administration

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199655
SPARE PARTS PROVISIONING STUDY

Mystech Associates, Incorporated, P. O. Box 220, Mystic, Connecticut 06355

Executive Summary, MA–RD–920–79068A, Sept 1979

This study presents the results of an assessment of the scope of spare parts provisioning, utilization, and control within the maritime industry. It encompasses both a qualitative and quantitative assessment of spare parts requirements for a typical merchant ship, and includes prevailing maritime industry practices regarding spare parts identification, procurement, inventory, control, and centralized warehousing and pooling.

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050826
LIQUEFIED NATURAL GAS RESEARCH AND FACILITY REQUIREMENTS AT THE NATIONAL MARITIME RESEARCH CENTER GALVESTION, TEXAS

Poth, LJ

National Maritime Research Center, Galveston, Texas 77550

Technical Report, NMRC–273–37000–R1, May 1973, 70pp

Research Programs at the Liquefied Natural Gas (LNG) Center of the National Maritime Research Center (NMRC) – Galveston have been defined to assist in the solution of technical problems facing LNG tanker shipbuilders. Both analytical and experimental research programs are identified; the facilities required to carry out these research programs are also discussed.

NTIS

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084853
WAVE HEIGHT INDICATOR LITERATURE SEARCH AND VENDOR DATA SURVEY

Carleton, H

Maritime Administration, Washington, DC 20230

May 1974, 23pp

The report presents the results of a limited literature search into wave meters that are used aboard ships to observe wave height and wave spectra. It also includes a review of some literature that is available on commercial wave meters that are applicable for use by ships in measuring wave height.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $3.25 COM–74–11788/8SL; Microfiche $2.25.

095153
WAVE HEIGHT INDICATORS

Carleton, H

National Maritime Research Center, Kings Point, New York 11024

NMRC–KP–123A, Oct 1974, 22pp

This report presents the results of a limited literature search into wave measuring equipment that are used aboard ships to observe wave height and wave spectra. It also includes a review of literature available on commercial wave meters that are applicable for use by ships in measuring wave height. (Author)

NTIS

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128223
INSTRUMENTATION OF M/V ROGER BLOUGH, 1973–1974 SEASON

Wheaton, JW

Teledyne Materials Research Company, Waltham, Massachusetts 02154

MA–RD–940–76–06, 31pp

This report presents data acquired during the first season of operations aboard the M/V Roger Blough. The Blough was instrumented for bending stress measurements at three deck locations in November, 1973 and data were recorded through January 30, 1974. The results of this first season showed a maximum peak–to–trough stress of 16,350 psi, of 200 half hour data intervals recorded, only 4 had stresses exceeding 10,000 psi. The springing period was determined to be about 2.4 seconds. A summary of these results also appears in the second season report.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $3.75 COM–75–11129/4GA; Microfiche $2.25.

151321
PHOTOGRAMMETRY IN SHIPBUILDING

Kenefick, JF Chirillo, L

Todd Shipyards Corporation, Seattle, Washington

MA–RD–920–77036, July 1976, 60pp

This study reports on the results of an investigation of the applicability of photogrammetry to dimensioning problems which frequently occur in shipbuilding. Particular emphasis is placed on applications which have the greatest potential for improving productivity.

NTIS

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156825
STANDARDIZED STERN PROJECT

J.J. Henry Company, Incorporated, New York, New York 10048

3 Vols., Sept 1976, 497pp

The Standardized Stern Project final report describes the development of a series of three standardized stern section designs intended for application over a wide range of merchant vessel types and sizes. The report examines both the technical and economic influences on design, including trade forecasts, demand for new construction, hydrodynamic limitations and propulsion requirements. The design development approach is summarized, and technical and economic feasibility analyses of the resulting designs are provided. The report concludes that the standardized stern concept could be employed to achieve very substantial gains in ship producibility with attendant reductions in unit cost. The concept's near–term marketability is evaluated, and recommendations for gaining industry acceptance are offered. A program for further development of the concept is proposed, including additional detailed design effort and prototype development. The Standardized Stern Project final report is arranged in three volumes as follows: Volume I: Final Report presents a technical and economic overview of standardized stern design concepts. Volume II: Executive Summary provides a brief review of the study's conclusions and recommendations. Volume III: Appendix includes detailed project task reports, engineering drawings, tabulated data and other appended documentation.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price.

175114
ANALYSIS OF WAVE SPECTRA AT STATION "PAPA"

Hoffman, D

National Maritime Research Center, Kings Point, New York 11024

NMRC—KP—173 146pp

A sample of 660 wave records collected by the Canadian Weather Ship at Station "Papa" in the north—eastern Pacific (50 degrees N, 145 degrees W), over a period of five years, is presented in spectral form as analyzed by Lockheed. The general characteristics of the wave data are discussed and evaluated in comparison with surface log data as recorded manually. Comparison of wave characteristics with similar data recorded at Station "India", in the north—eastern Atlantic (59 degrees N, 19 degrees W), is shown, along with a comparison of spectra representing several identical groups of wave height at the two locations.

NTIS

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175136
SOME PRACTICAL CONSIDERATIONS IN REDUCING REQUIRED POWER FOR SHIPS

Hamlin, N

Webb Institute of Naval Architecture, Glen Cove, New York 11542

NMRC—KP—161, Oct 1977, 61pp

Various methods of reducing the propulsive power required by screw—propelled ships are considered. These include reducing surface roughness of hull and propeller, selecting optimum hull proportions and fullness for reduced power operation, enlarging the diameter of the propeller together with reducing propeller RPM, use of a ducted propeller rather than an open propeller, possible use of contra—rotating propellers, alternative modes of operation of twin screws at reduced power, reduction of above—water hull and superstructure resistance due to air drag are discussed in this report.

NTIS

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175139
WAVE MEASUREMENT AND IMPLEMENTATION ABOARD SHIP

Hoffman, D

Webb Institute of Naval Architecture, Glen Cove, New York 11542

NMRC—KP—141, July 1977, 64pp

Several possible wave data collection schemes using oceangoing ships as measuring platforms are discussed. Wave data sources from visual observation, forecasting, and direct measurement are reviewed. The application to ship operation of improved wave data aboard ship is illustrated. Shipboard wave data collection systems are evaluated.

NTIS

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175335
DEVELOPMENT OF SHIP LOADING VALUES (BOW IN COLLISION), TASK VIII

Minorsky, V

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, MA—RD—920—78013, 7701—7705, Jan 1978, 55pp

With formulations collected by K. Reckling the collapsing resistance of the OBO TARIM's Model Bow was calculated for several stages of penetration. In collision test no. 9 performed by the German Nuclear Research Institute (GKSS) the overall penetration for a known impact energy was known: This is compared with the area under the curve of impact forces calculated at several points during penetration. The work so calculated was found to be 39% less than the energy spent in the test. Possible explanations for this discrepancy are given.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—276739/0ST.

199315
FEASIBILITY OF SAILING SHIPS FOR THE AMERICAN MERCHANT MARINE

Woodward, JB Beck, RF Scher, RM Cary, CM

University of Michigan, Department of Naval Architecture & Marine Engineering, Ann Arbor, Michigan 48109

Research Report, MA—RD—930—75058, Feb 1975, 103pp

The University of Michigan has studied the possible use of sailing cargo ships in the contemporary American Merchant Marine. The study was promoted by recent world developments in energy supply and environmental concern, the most significant being the sharp rise in cost of energy required to drive a powered ship. Second is a complex set of changes that can be generally classified as technological advances, such as the improvements in materials that can be used for sails and rigging, and the immense advances in communication and control technology. A third development is the change in standards for seagoing, which includes improvements in safety standards, habitability standards and major changes in wage structures.

NTIS
Maritime Administration

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199334
LNG TANK DESIGNS

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—272—23000—R1, Dec 1972, 72pp

Various systems for shipboard containment of liquid natural gas (LNG) that are either in service or seriously proposed for service are described. The influence of LNG upon the general design of the ship is discussed and it is shown that the characteristics of LNG as a cargo have combined to result in a ship that has special tanks, special safety systems, special propulsion systems and a conspicuous appearance. Twelve of the more prominent free—standing tank designs and eight of the more prominent membrane tank designs are discussed. Costs for the LNG shipbuilding contracts awarded to General Dynamics and Newport News in October of 1972 are shown. Portions of this report are not fully legible.

NTIS
Maritime Administration

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199343
SEGREGATED BALLAST TANKER STUDY: VOLUME II: PLANS

J.J. Henry Company, Incorporated, Two World Trade Center, New York, New York 10048

Final Report, MA—RD—900—73024, Jan 20, 1972, 135pp

The volume contains: composite plan of 250,000 DWT, 120,000 DWT and 500,000 DWT tanker. Plans for each tanker with common numerous identifications as follows: general arrangement, midship section and typical transverse web; typical O.T. transverse and longitudinal bulkheads; and typical diagrammatic piping arrangement.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—73—10579. Available in microfiche only.

199344
SEGREGATED BALLAST TANKER STUDY: VOLUME I: TEXT AND SUMMARY DATA

J.J. Henry Company, Incorporated, Two World Trade Center, New York, New York 10048

Final Report, MA—RD—900—73023, Feb 25, 1972, 114pp

The report details the findings in a study to determine the construction costs, in a representative foreign shipbuilding center, of eight versions of a 250,000 ton tanker, two versions of a 120,000 ton tanker and two versions of a 500,000 ton tanker.

NTIS
Maritime Administration

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199390
FRAME SPACING ALTERNATE SHAPES FOR LONGITUDINALS, AND WIDER PLATES FOR PRODUCTIVITY

Todd Shipyards Corporation, Seattle, Washington

Final Report, M—3—NSRP—F, Aug 1973, 95pp

The overall objective of this study was to determine a more economical arrangement of plates and shapes for merchant ship hulls. Two real modern—ship designs, one for a tanker and the other for a container ship, were investigated with primary emphasis on productivity. Three aspects were considered separately: 1) increased transverse frame spacing, 2) use of bulb flat, flat bar or Yoder angles for longitudinals, and 3) use of wider plates. Equations were developed for evaluation of the costs that would apply to alternate configurations of the two ship designs.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number M—3—NSRP—F.

199403
REQUIREMENTS STUDY FOR THE AUTOMATION OF MARITIME OPERATIONAL DATA CENTER

Grumman Data Systems Corporation, Bethpage, New York 11714

Final Report, NMRC—KP—139, 187pp

This report is the result of a Requirement Study for the Maritime Operational Data Center. Five initial data bases proposed for inclusion in the Center are analyzed in detail and a computerized system for processing this data and future data bases is described. The purpose of this system is to provide key maritime data to research personnel and to provide a computer base for resolving engineering and statistical problems.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—KP—139.

199408
OPEN OCEAN WAVE STUDIES: VOLUME I

Larsen, LH Fenton, D

University of Washington, Department of Oceanography, Seattle, Washington 98195

Data Report, W—2—0—Vol.I, Feb 1976, 38pp

This volume contains a report on a program begun in response to the needs of those concerned with modeling the behavior of ships in a seaway and for those whose responsibility it is to design and insure vessels. The data discussed in this report represent a first effort at obtaining open wave data in a format suitable for extensive analysis.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number W—2—0—Vol.I.

199409
OPEN OCEAN WAVE STUDIES: VOLUME II: PART I

Larsen, LH Fenton, D

University of Washington, Department of Oceanography, Seattle, Washington 98195

Data Report, W—2—0—Vol.II, PT.I, May 1974

This volume presents the details of the individual wave records. Each record consists of 2046 12—bit words taken at intervals of .8789 seconds. This is volume II of the initial data report of the 1972—3 Cobb Seamount wave experiment.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number W—2—0—Vol.II, PT.I.

199410
OPEN OCEAN WAVE STUDIES: VOLUME II: PART II

Larsen, LH Fenton, D

University of Washington, Department of Oceanography, Seattle, Washington 98195

Data Report, W—2—0—Vol.II, PT.II, May 1974

This volume presents wave data from January 1, 1973 to April 17, 1973. It is part of the data study from the Cobb Seamount wave experiment.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number W—2—0—Vol.II, PT.II.

199415
CONSOLIDATED CARGO LINER DESIGN

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, S—5—5564—ES, Apr 1976

The purpose of this project was to develop a consolidated design, incorporating the requirements of several steamship operators for a cargo liner to be procured in fiscal 1976. Participating operators were called on to furnish performance specifications and comments on existing designs which would form the basis for the preparation of a preliminary baseline design for the ship that would meet the requirements of the maximum number of participating operators.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5564—ES.

199416
DIRECTIONAL WAVE SPECTRA INVESTIGATIONS IN THE NORTH PACIFIC

Sea Use Foundation, Seattle, Washington 98101

Final Report, S—4—D, Dec 1974, 12pp

The objectives of these investigations were to collect and analyze wave and ship strain data for the North Pacific Ocean area and to present the data in a manner most useful to ship designers. In conjunction with one element of the data collection effort, a prototype bridge mounted strain warning instrument was to be developed and evaluated and specifications were to be developed for a low cost, high reliable strain recording system. The Station PAPA analog records, made available by the Canadian Department of the Environment, were the most comparative analyses relative to the wave characteristics encountered on the North Pacific and West Coast to Alaska routes, as well as information on which preliminary comparisons were made of Pacific versus Atlantic wave conditions.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—4—D.

199425
ANALYSIS OF WAVE DATA FROM COBB SEAMOUNT (46 DEGREES N., 130 DEGREES W.)

Walden, DA Hoffman, D

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, NMRC—KP—175, July 1977, 74pp

Wave data from Cobb Seamount, located in the north—eastern part of the Pacific Ocean (46 deg 46 min N, 130 deg 49 min W), is presented in spectral form. A spectral family of the Cobb Seamount Data is shown and compared with similar data previously derived from wave records at Station PAPA (50 deg N, 145 deg W). A systematic shift toward lower frequency in the Seamount wave spectra is shown, and it is recommended that additional investigation should be extended to account for this shift.

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Maritime Administration

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199428
COMPARISON OF MARINE SYSTEM EVALUATION TECHNIQUES FOR USE AT NMRC

Hirasaki, MP

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—273—31000—R1, Aug 1974, 65pp

This report examines five methods for predicting the performance of marine systems: (1) small model basin testing, (2) large model basin testing, (3) open—water model testing, (4) open—water prototype testing, and (5) computer analysis. Cost and data quality are discussed, and the methods are evaluated for possible application at the National Maritime Research Center—Galveston.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—273—31000—R1.

199429
PROGRAM FOR THE DEVELOPMENT OF BARGE TRAIN LINKAGE SYSTEMS

Hirasaki, MP

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—272—21000—R3, Aug 1974, 42pp

Beginning with a survey of the state of the art of pushed barge trains, the report details a test and development program for barge train linkage systems. Conducted by the National Maritime Research Center—Galveston, the program includes the design and future construction of the MARAD Large Model Test Basin. In addition to the details of the wave basin and the pneumatic wave generator, the report explains the steps in the development of the research program including new concepts in linkage computer program which simulates the barge motions and linkage forces.

Maritime Adminstration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—272—21000—R3.

199497
ANALYSIS OF WAVE SPECTRA AT STATION "PAPA": VOLUME II

Hoffman, D

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Appendices, W—35—A—Vol.II, Dec 1974

The appendices contain: A) lists of Surface Log Data and Special Characteristics, B) Spectral Family, sample of 8, C) Spectral Family, sample of 8.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number W—35—A—Vol.II.

199499
ANALYSIS OF DATA OBTAINED ON BOARD TWO AMERICAN MAIL LINE VESSELS

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Data Analysis Report, W—35—AOD, Jan 8, 1975, 17pp

Equipment was designed and installed aboard the S.S. Japan Mail and Philippine Mail of the American Mail Line to record ship hull strains and wave profiles. In addition, a slamming data acquisition system was installed on the Philippine Mail. A description of the instrumentation, its installation, operational problems and results is given, as well as a review of the results covering hull strains and wave data.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number W—35—AOD.

199512
NEOBULK SHIP DESIGN IMPROVEMENT PROJECT RESEARCH REPORT

Bath Iron Works Corporation, Bath, Maine

Final Report, MA—RD—930—76027, Dec 1975, 420pp

The Neobulk Ship Design Improvement Project Study was accomplished in five principal tasks: development of overall plan and schedule, development of a baseline design, development of an economic evaluation method, design improvement studies, and development of an improved ship design. Separate research reports describing the research methods and results were prepared for Tasks 2, 3, 4, and 5. These separate task reports have been bound together to form this Neobulk Ship Design Improvement Project Research Report. They incorporate comments made on draft copies of the reports. Portions of this document are not fully legible.

NTIS
Maritime Administration

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199513
NEOBULK SHIP DESIGN IMPROVEMENT PROJECT

Bath Iron Works Corporation, Bath, Maine

Research Summary Report, MA—RD—930—76026, Aug 29, 1975, 46pp

Neobulk cargoes are an increasingly significant sector of U.S. foreign trade flows. This work had as its objective the development of a ship design for carriage of neobulk cargos on a 'semi—liner' mode of service. Using a baseline design, five (5) design improvement tasks were undertaken in critical functional areas. Based on these, an improved design was developed. An improvement of 12% in required freight rate was achieved for the specific service routes assumed.

NTIS
Maritime Administration

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199522
COLLATION OF NORTH PACIFIC WAVE DATA FROM STATION "PAPA", COBB SEAMOUNT AND TWO AMERICAN MAIL LINE VESSELS DURING 1972—3

Lockheed Shipbuilding and Construction Company, Seattle, Washington

Final Report, LSCC—3838—ANN—C—5, Aug 1974, 60pp

The report collates North Pacific Wave Data from Station "Papa", Cobb Seamount, and two American Mail Line vessels during 1972—3.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number LSCC—3838—ANN—C—5.

199523
EVALUATION OF A PROTOTYPE STRESS WARNING SYSTEM

Lockheed Shipbuilding and Construction Company, Seattle, Washington

Final Report, LSCC—3838—ANN—C—4, March 1974, 36pp

In the course of preparing constraints for a ship and wave data information system for the SEA USE Foundation, considerable interest was expressed in a display that would provide new information to the ship's officer. From this evolved a task to develop, fabricate and test such a prototype instrument. This report describes the design and operation of the system, relates operating experience including equipment performance and officer acceptance on the American Mail Line Containership, Philippine Mail, evaluates technical and functional performance, recommends improvement, and evaluates extension of the system to include wave height data.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number LSCC—3838—ANN—C—4.

199527
IMPROVED DESIGN PROCESS: SHIP PRODUCIBILITY PROGRAM

Bath Iron Works Corporation, Bath, Maine

Executive Summary, BIW—3—N—Task D—2, Apr 1977, 15pp

The primary objective of this task of the National Shipbuilding Research Program was to reduce the cost of shipbuilding in U.S. shipyards. It studies the preliminary and contract design processes in order to define systematic approaches to contract level design, as well as the design processes used in various yards to produce the detailed construction drawings, and methods of improvement to make them more cost effective and producible.

Maritime Administration

This document is avaiable for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number BIW—3—N—Task D—2.

199531
DEVELOPMENT OF A CONSOLIDATED CARGO—LINER DESIGN: UNITED STATES LINES, INC.

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Preliminary Design Report, S—5—5564—USL, Jan 30, 1976

In a project to develop a consolidated cargo—liner design Task 5 resulted in designs by Matson Navigation Company, United States Lines, Inc., and American Export Lines, Inc. This report contains that of United States Lines, Inc. The final base line design includes an inboard profile, deck plans, machinery arrangements, equipment list, preliminary midship section, preliminary rough faired body plan, estimated speed—power curve, preliminary hydrostatic curves,preliminary flooding curves with Bonjean curves and trim lines, a stability check, outline specifications, and a weight estimate sufficient to permit development of a preliminary cost estimate.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5564—USL.

199532
DEVELOPMENT OF A CONSOLIDATED CARGO—LINER DESIGN: AMERICAN EXPORT LINES, INC.

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Preliminary Design Report, 8—5—5564—AEL, Jan 30, 1976

In a project to develop a consolidated cargo—liner design Task 5 resulted in designs by Matson Navigation Co., United States Lines, Inc. and American Export Lines, Inc. This report contains that of American Export Lines, Inc. The final base line design includes an inboard profile, deck plans, machinery arrangements, equipment list, preliminary midship section, preliminary rough faired body plan, estimated speed—power curve, preliminary hydro—static curves, preliminary flooding curves with Bonjean curves and trim lines, a stability check, outline specifications, and a weight estimate to permit development of a preliminary cost estimate.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5564—AEL.

199533
DEVELOPMENT OF A CONSOLIDATED CARGO—LINER DESIGN: MATSON NAVIGATION COMPANY

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Preliminary Design Report, S—5—5564—MNC, Jan 30, 1976

In a project to develop a consolidated cargo—liner design Task 5 resulted in designs by Matson Navigation Company, United States Lines, Inc., and American Export Lines, Inc. This report contains that of Matson Navigation Company. The final base line design includes an inboard profile, deck plan, machinery arrangements, equipment list, preliminary midship section, preliminary rough faired body plan, estimated speed—power curve, preliminary hydro—static curves, preliminary flooding curves with Bonjean curves and trim lines, a stability estimate sufficient to permit development of a preliminary cost estimate.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5564—MNC.

199534
DEVELOPMENT OF A CONSOLIDATED CARGO—LINER DESIGN: TASK 4 PRELIMINARY BASE LINE DESIGNS

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Design Report, S—5—5564—4, Jan 9, 1976

In a project to develop a consolidated cargo—liner design, Task 4 aimed to present preliminary base line designs. Farrell Lines C8—S—85d Design was selected as the base line design.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5564—4.

199535
DEVELOPMENT OF A CONSOLIDATED CARGO—LINER DESIGN: TASK 2: DATA ON CANDIDATE DESIGNS

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Design Data Report, S—5—5564—2, Dec 19, 1975

In Task 2 of a project to develop a consolidated cargo—liner design, information on candidate designs is presented in the form of a small scale arrangement plan and a tabulation of ship characteristics.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5564—2.

199536
DEVELOPMENT OF A CONSOLIDATED CARGO—LINER DESIGN: TASK 1: CATALOG OF DESIGN REQUIREMENTS

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Design Requirements Report, S—5—5564—1, Dec 15, 1975

The purpose of this project was to develop a consolidated design for a cargo—liner to be procured in FY—76. The four steamship operators participating in the project were: American Export Lines, Inc., Farrell Lines Incorporated, Matson Navigation Company, United States Lines, Inc. This Task 1 report consists of a catalog of design requirements.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5564—1.

199537
STANDARDIZED STERN PROJECT: VOLUME III: APPENDIX: ANNEX A—1

J.J. Henry Company, Incorporated, Two World Trade Center, New York, New York 10048

Engineering Drawings, H—4—S—Vol.III—App—Annex—A—1, 1976

This report is an annex to the Volume III appendix for the Standarized Stern project. It contains engineering drawings.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number H—4—S—Vol.III—App—Annex—A—1.

199538
STANDARDIZED STERN PROJECT: VOLUME III

J.J. Henry Company, Incorporated, Two World Trade Center, New York, New York 10048

Appendix, H—4—S—Vol.III—App, Dec 1976, 463pp

This appends a project which investigated a method for minimizing the number of stern section design variables (including hull form and structure, propulsion machinery arrangement, and deckhouse) in order to produce a fleet—adaptable stern design to serve the U.S. Flag bulk, neo—bulk, and unitized dry cargo vessels. The project considered the long term applicability of the standardized stern concept over a thirty year planning horizon. The project's objectives were accomplished in three tasks — 1) determination of design requirements, 2) development of conceptual designs, and 3) assessment of the standardized stern project.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number H—4—S—Vol.III—App.

199565
INSTRUMENTATION AND ANALYSIS OF DATA COLLECTED ON THE S.S. JAPAN MAIL AND S.S. PHILIPPINE MAIL FROM DECEMBER 1971 TO JULY 1973

Lockheed Shipbuilding and Construction Company, Seattle, Washington

Final Report, LSCC—3838—Ann—C—1—Vol.II, June 1974

Volume II contains: Appendix A, Operating instructions for Instrumentation Systems on the S.S. Japan Mail and the S.S. Philippine Mail; Appendix B, S.S. Japan Mail and S.S. Philippine Mail Ship Log Extractions, 1972—3; and Appendix C, Computer Program Listing of Data Reduction of Lockheed Digitized Tapes.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number LSCC—3838—ANN—C—1—Vol.II.

199566
INSTRUMENTATION AND ANALYSIS OF DATA COLLECTED ON THE S.S. JAPAN MAIL AND THE S.S. PHILIPPINE MAIL FROM DECEMBER 1971 TO JULY 1973

Lockheed Shipbuilding and Construction Company, Seattle, Washington

Final Report. LSCC—3838—ANN—C—1—Vol.III, July 1974

Volume III is an appendix to the Sea Use Foundation final report on Directional Wave Spectra Investigations in the North Pacific.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number LSCC—3838—Ann—C—1—Vol.III.

199567
INSTRUMENTATION AND ANALYSIS OF DATA COLLECTED ON THE S.S. JAPAN MAIL AND S.S. PHILIPPINE MAIL FROM DECEMBER 1971 TO JULY 1973

Lockheed Shipbuilding and Construction Company, Seattle, Washington

Final Report, LSCC—3838—ANN—C—1—Vol.I, June 1974

This study addresses the following: 1) design, fabricate, and install a data acquisition system onboard the American Mail Line jumbosized containership, S.S. Japan Mail, for ship strain, wave and wind data, and record, reduce and analyze the collected data; 2) design, fabricate, and install a data acquisition system onboard the American Mail Line jumbosized containership, S.S. Philippine Mail, for ship strain, wave and wind data, and record, reduce and analyze the collected data, and 3) instrument the S.S. Philippine Mail with a slamming data acquisition system and record and analyze the collected data.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number LSCC—3838—ANN—C—1—Vol.I.

199571
TOWING BASIN TESTS WITH A 1/100 SCALE MODEL OF THE S.S. JAPAN MAIL

Lockheed Shipbuilding and Construction Company, Seattle, Washington

Final Report, LSCC—3838—ANN—C—2, March 1974, 42pp

This study provides additional calibration data for the model of the S.S. Japan Mail, through reassemblage.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number LSCC—3838—ANN—C—2.

199577
DEVELOPMENT OF A CONSOLIDATED CARGO—LINER DESIGN: TASK 5: FINAL PRELIMINARY DESIGN

George G. Sharp, Incorporated, 100 Church Street, New York, New York 10007

Final Report, S—5—5564—USL, Jan 30, 1976

This report addressed Task 5, as follows: based upon comments received from the participating companies, refine the base line design to accommodate the needs of a maximum number of participants consistent with the requirement to utilize, to the maximum extent possible, data previously developed for existing designs. The level of detail required in the final base line design shall include an inboard profile, deck plans, machinery arrangements, equipment list, preliminary midship section, preliminary rough faired body plan, estimated speed—power curve, preliminary hydro—static curves, preliminary flooding curves with Bonjean curves and trim lines, a stability check, outline specifications, and a weight estimate sufficient to permit development of a preliminary cost estimate.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number S—5—5564—USL.

199608
TEST AND EVALUATION OF ICE TRANSITING BOW FORMS FOR GREAT LAKES BULK CARRIERS

Kim, JK Voelker, RP

ARCTEC, Incorporated, 9104 Red Branch Road, Columbia, Maryland 21045

MA—RD—940—77072, March 1978, 160pp

The purpose of this project was to design, test and evaluate several ice transiting bow forms for Great Lakes bulk carriers. Tasks within the project included the design of four ice transiting bow forms, the conduct of open water and ice resistance tests (level and broken ice) and an economic evaluation of the bowforms. In addition, a limited number of maneuvering tests in ice were performed along with the measurement of ice impact forces on the model.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC:Req. Price, PB281697/AS.

199628
THE APPLICATION OF AIR CUSHION CONFIGURATIONS TO ICEBREAKING

Decker, JL

J.L. Decker, 12613 Newgate Road, Potomac, Maryland 20854

Final Report, MA—RD—940—78058, July 1978, 205pp

The objective of the project was the quantitative evaluation of the cost and effectiveness of air cushion configurations in icebreaking applications with displacement ships in level ice fields. Simple theoretical methods were developed for the prediction of the air cushion icebreaking capability in the low speed and high speed icebreaking modes. Conceptual designs for air cushion icebows and air cushion icebreakers were prepared and the economic analysis of their use with the displacement ships is reported. The self propelled air cushion icebreaker was determined to provide more flexible operational capability and was more cost effective for the cases examined.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB284011/AS.

199638
ECONOMIC BENEFITS OF IMPROVED WATERTIGHT SUBDIVISION FOR GREAT LAKES BULK CARRIERS

Stearn, RA Foss, BE Scher, RM

R. A. Stearn, Incorporated, 253 N. First Avenue, Sturgeon Bay, Wisconsin 54235

MA—RD—940—79031, Dec 1978

The study presents a discussion of the random processes associated with the potential benefits of subdivision, together with the methods used in evaluating the expected net present value. Section III provides a general introduction to the concept of utility, and the utility function, including a brief discussion of the role of insurance in determining expected utility. Identified in Section IV are the various components of economic benefit arising from the improvement of watertight subdivision of Great Lakes ships. Section V presents the estimated costs of various subdivision arrangements for several typical classes of Great Lakes vessels, including initial and operating costs, added weights of bulkheads, pumps and piping, and damage—control systems. Section VI introduces the sample used in determining the estimated parameters of the random processes, together with statistical tests of certain hypotheses derived from the sample. Specific examples of the determination of benefits, including input data, assumptions, and results for a number of ship classes, are presented in Section VII, while Section VIII compares the anticipated economic benefits o improved watertight subdivision with those available from other types of safety systems.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB295068/AS.

199656
DEVELOPMENT OF A STANDARDIZED U.S. FLAG DRY—BULK CARRIER: PHASE I

M. Rosenblatt & Son, Incorporated, New York, New York 10013

Executive Summary, R—6—D—Phase I—Exec. Summary, Jan 1979

This report presents the findings of the first phase of a study to develop a standardized U.S. flag dry—bulk carrier, conducted by M. Rosenblatt & Son, Inc. and its team of subcontractors under contract No. 7—38053 to the United States Department of Commerce, Maritime Administration. The objective of this study was to develop the requirements and establish the factors needed for long range competitiveness of the ships found to be the most suitable for serving the dry—bulk trades of the U.S. The effort to meet this objective included the identification of markets for U.S. dry—bulk exports and imports through the turn of the century, the development of projections of the demand for U.S. flag ships, the identification of the characteristics of a series of standardized designs to meet the projected demand for both the near and far term, the selection of the ship types most likely to be built in the U.S., and the identification of existing foreign designs that are most suitable for U.S. production and operation.

NTIS
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TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB293368/AS.

199657
DEVELOPMENT OF A STANDARDIZED U.S. FLAG DRY—BULK CARRIER: PHASE I

M. Rosenblatt & Son, Incorporated, New York, New York 10013

Final Report, R—6—D—Phase I, Jan 1979, 207pp

This report presents the findings of the first phase of a study to develop a standardized U.S. flag dry—bulk carrier, conducted by M. Rosenblatt & Son, Inc. and its team of subcontractors under contract No. 7—38053 to the United States Department of Commerce, Maritime Administration. The objective of this study was to develop the requirements and establish the factors needed for long range competitiveness of the ships found to be the most suitable for serving the dry—bulk trades of the U.S. The effort to meet this objective included the identification of markets for U.S. dry—bulk exports and imports through the turn of the century, the development of projections of the demand for U.S. flag ships, the identification of the characteristics of a series of standardized

designs to meet the projected demand for both the near and far term, the selection of the ship types most likely to be built in the U.S., and the identification of existing foreign designs that are most suitable for U.S. production and operation.

NTIS
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199658
DEVELOPMENT OF A STANDARDIZED U.S. FLAG DRY—BULK CARRIER: APPENDIX A

M. Rosenblatt & Son, Incorporated, New York, New York 10013

Appendix, R—6—D—Appendix, Jan 1979

Identification of dry—bulk commodities and trades.

NTIS
Maritime Administration

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199659
DEVELOPMENT OF A STANDARDIZED U.S. FLAG DRY—BULK CARRIER: APPENDIX B

M. Rosenblatt & Son, Incorporated, New York, New York 10013

Appendix, R—6—D—Appendix, Jan 1979

Zone—to—zone traffic flow, U.S. dry—bulk trades: 1974—1977.

NTIS
Maritime Administration

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199660
DEVELOPMENT OF A STANDARDIZED U.S. FLAG DRY—BULK CARRIER: APPENDIX C

M. Rosenblatt & Son, Incorporated, New York, New York 10013

Appendix, R—6—D—Appendix, Jan 1979

An analysis of the competitive environment in the bulk shipping industry.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB293372.

199661
DEVELOPMENT OF A STANDARDIZED U.S. FLAG DRY—BULK CARRIER: APPENDIX D

M. Rosenblatt & Son, Incorporated, New York, New York 10013

Appendix, R—6—D—Appendix, Jan 1979

Identification of design alternatives.

NTIS
Maritime Administration

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199662
DEVELOPMENT OF A STANDARDIZED U.S. FLAG DRY—BULK CARRIER: APPENDIX E

M. Rosenblatt & Son, Incorporated, New York, New York 10013

Appendix, R—6—D—Appendix, Jan 1979

Design selection.

NTIS
Maritime Administration

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199664
NEXT GENERATION CARGO LINER: PHASE I

J.J. Henry Company, Incorporated, Two World Trade Center, New York, New York 10048

Executive Summary, March 1979, 16pp

This study shows that the development of a standardized general cargo ship to meet the future requirements of the U.S. Merchant Marine would yield substantial benefits to ship operators, shipbuilders, and the government. Series production of such a ship could lower construction costs and cut production time significantly, resulting in a more competitive American Merchant Marine in the world shipping market. The study, prepared by J.J. Henry Co. and Temple, Barker, Sloane, Inc., was co—sponsored by MarAd and seven U.S. flag ship operators (American Export, Farrell, Matson, Moore—McCormack, Lykes, PRMSA and U.S. Lines). The work effort produced forecasts of general cargo movements and service requirements on selected worldwide trade routes for each participating operator. Customized ship designs for each operator were then developed from which a standardized composite design was selected.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB297588/AS.

199665
NEXT GENERATION CARGO LINER: PHASE I

J.J. Henry Company, Incorporated, Two World Trade Center, New York, New York 10048

Final Report, March 1979

This study shows that the development of a standardized general cargo ship to meet the future requirements of the U.S. Merchant Marine would yield substantial benefits to ship operators, shipbuilders, and the government. Series production of such a ship could lower construction costs and cut production time significantly, resulting in a more competitive American Merchant Marine in the world shipping market. The study, prepared by J.J. Henry Co. and Temple, Barker, Sloane, Inc., was co—sponsored by MarAd and seven U.S. flag ship operators (American

Export, Farrell, Matson, Moore—McCormack, Lykes, PRMSA, and U.S. Lines). The work effort produced forecasts of general cargo movements and service requirements on selected worldwide trade routes for each participating operator. Customized ship designs for each operator were then developed from which a standardized composite design was selected.

NTIS
Maritime Administration

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199666
NEXT GENERATION CARGO LINER: PHASE I

J.J. Henry Company, Incorporated, Two World Trade Center, New York, New York 10048

Appendices, March 1979

This study shows that the development of a standardized general cargo ship to meet the future requirements of the U.S. merchant marine would yield substantial benefits to ship operators, shipbuilders, and the government. Series production of such a ship could lower construction costs and cut production time significantly, resulting in a more competitive American merchant marine in the world shipping market. The study, prepared by J.J. Henry co. and Temple, Barker, Sloane, Inc., was co—sponsored by MarAd and seven U.S. flag ship operators (American Export, Farrell, Matson, Moore—McCormack, Lykes, PRMSA, and U.S. Lines). The work effort produced forecasts of general cargo movements and service requirements on selected worldwide trade routes for each participating operator. Customized ship designs for each operator were then developed from which a standardized composite design was selected.

NTIS
Maritime Administration

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084845
A MODEL STEERING STUDY

Femenia, J van Hooff, R Lewis, EV Zubaly, RB

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, April 1974, 55pp

This report describes the first year's work, at Webb Institute, on developing a direct digital steering system for controlling a ship model in a towing tank and evaluating different control equations and parameters. After a background discussion of automatic steering devices and principles, the model test set-up at Webb Institute, using a model of the SL-7 container ship, is described in detail. The steering gear itself is a mechanical-electrical analog of a full-scale steering gear. The automatic control is provided by a PDP-8 minicomputer, with the necessary analog-to-digital and digital-to-analog interface equipment. Results of preliminary tests are given.

NTIS

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090747
ELECTRONIC DOCKING SYSTEMS

Carleton, H

National Maritime Research Center, Kings Point, New York 11024

Final Report, NMRC-KP-116A, Oct 1974, 39p

The report reviews existing literature on electronic docking systems. Various systems are described and discussed. Results of interviews with pilots and ship operators, regarding their needs for docking systems, are summarized and a program initiated by NMRC-KP to develop a docking system is described.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $3.75 COM-75-10139/4ST; Microfiche $2.25.

095147
HEAVY WEATHER DAMAGE INSTRUMENTATION SYSTEMS

Carleton, H Winton, H

National Maritime Research Center, Kings Point, New York 11024

NMRC-KP-120A, 1974, 25pp

The phenomena known to be the cause of hull damage in heavy weather are slamming, the shipping of green water over the bow, and excessive hull stress. This report presents the results of a limited literature search on these phenomena, and a description of several commercially available systems which have been developed for measuring these forces.

NTIS

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099447
A STUDY OF DYNAMIC LOADS CAUSED BY LIQUID SLOSHING IN LNG TANKS. VOLUME I. TEXT AND FIGURES

Olsen, HA Hysing, T

Norske Veritas, Oslo, Norway

MA-RD-920-75040, 299pp

The effects of fluid properties on scaling liquid sloshing pressures and forces were investigated. Sloshing pressures and forces were measured in both prismatic and spherical tanks for a range of fill depths, excitation amplitudes and frequencies. Loads on internal tank components, such as pump towers, were also determined for spherical tanks.

NTIS

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169664
EXPERIMENTAL EVALUATION OF THE SEAWORTHINESS CHARACTERISTICS OF FLEXIBLY CONNECTED BARGE TRAINS

Rossignol, GA Ruth, LC Woo, EL

David Taylor Naval Ship R&D Center, Bethesda, Maryland 20034

SPD-P-645-01, 65pp

This report presents the results of seaworthiness experiments conducted with a system of models of four semirigidly linked river barges which is referred to as the Barge Train. The linkage connectors permit relative pitch freedom and some relative heave displacement; but considerable restraint is provided for all other relative motions. Some of the more important results of the investigation are: (a) Barge linkage connector configuration 3 resulted in considerably larger motions and forces than did connector configurations 1 or 2; while the heave acceleration of the barges are smallest for connector configuration 1. (b) The most severe moments and forces measured during the entire experiment were at the 120 degree heading. For /LA = 1.75 and at a wave steepness of 1/50, barges B and C began to collide with each other and the connectors between them were severely bent. (c) The Barge Train motions are greatest at the 120 degree heading. (d) For most of the conditions, the forces and moments at the connectors between barges B and C were larger than for any of the other connectors. (Color illustrations reproduced in black and white)

NTIS

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199420
REMOTE CONNING CONTROL UNIT

Spurgin, WT

Sperry Rand Corporation, Marine Systems Division, Charlottesville, Virginia 22901

Final Report, MA-RD-930-7066, June 1977

A Remote Conning Control Unit (RCCU) was designed and installed on CV EXPORT FREEDOM. Working in conjunction with an installed digital display system and utilizing the ship's existing steering and propulsion systems, the RCCU System features two bridge wing controllers for use in docking and maneuvering. Transfer to the RCCU System is controlled from the wheelhouse, and control may be taken back by the wheelhouse at any time. Direct control of the propulsion plant and both followup and non-followup control are possible.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA-RD-930-7066.

199422
A REVIEW OF SHIP'S PERFORMANCE MONITORING TECHNIQUES

Eclectech Associates, Incorporated, North Stonington, Connecticut 06359

Interim Report, NMRC–KP–178, 26pp

This report describes in detail the findings of related studies and develops equations for the required at–sea and shore–based calculations of ship's service speed.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC–KP–178.

199438
OPERATIONAL EVALUATION OF AN INTEGRATED CONNING SYSTEM: VOLUME II

Gross, CH Chernof, J

American Export Lines, Incorporated, New York, New York

Evaluation Report, MA–RD–900–74009, Nov 1973

This report presents the results of the design, installation, and evaluation of an integrated conning system on board the EXPORT FREEDOM under the terms of Cost–Sharing Contract 1–35410 between the Maritime Administration and American Export Lines, Inc. The shipboard installation and evaluation have established that the integrated conning system is technically feasible and economically desirable. Standard specifications, system evaluation, and operational summary were prepared. Due to the predetermined configuration of the EXPORT FREEDOM prior to the implementation of the subject contract, all systems and projected requirements for the optimized integrated conning system were not duplicated. However, the installed system provided meaningful technical and application benefits. Recommendations and work plans for follow–on phases.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA–RD–900–74009.

199448
MERCHANT SHIP DIGITAL CONNING DISPLAY AND DATA LOGGING SYSTEM

Heinlein, D Luse, JD Bettum, R

American Export Lines, Incorporated, New York, New York

Final Report, MA–RD–930–77067, May 1977

The results of developing and evaluating a digital conning display and data logging system are presented. The inception of the project from National Transportation Board Casualty Report is described. The system, its functions and operation are presented. The system displays rudder order, rudder angle, heading, speed, engine R.P.M., bow thruster power and water depth, all digitally at normal conning stations on the bridge of C/V EXPORT FREEDOM. In addition to the displayed parameters engine order, time, and day number are recorded digitally on magnetic tape. Conning commands and responses are recorded on the same tape. The findings of the evaluation are that the system is useful and has the potential to reduce the numbers of collisions and groundings. A system specification is presented.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA–RD–930–77067.

199498
SINGLE POINT MOORING (SPM) TECHNOLOGY, CURRENT AND FUTURE

Ocean Science and Engineering, Incorporated, Rockville, Maryland 20852

Final Report, NMRC–272–23100–R3, Oct 1974

This report is a state–of–the–art survey of single point moorings (SPMs) and a discussion of the problems and limitations in SPM terminal operations with suggested near–term and long–term research and innovations. The project includes a feasibility analysis of column–stabilized catamaran vessels as an improvement over the capabilities of existing service craft. A plan is provided for the implementation of technical advancements.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC–272–23100–R3.

199570
SYSTEM DEFINITION OF COMPUTER AIDED OPERATIONS RESEARCH FACILITY (CAORF): PHASE I

Sperry Rand Corporation, Sperry Systems Management Division, Great Neck, New York 11020

Final Report, GB–2521–1092, Nov 3, 1972

This report summarizes the results achieved by the Sperry System Management Division during the Phase I system definition effort of the CAORF development program, which began on July 1, 1971. The Phase I effort was directed toward the following: identification of areas of research needs of the U.S. maritime community, definition of CAORF technical requirements, design of CAORF and its subsystems, preparation of technical specifications and procurement documentation, and the selection of equipment suppliers.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number GB–2521–1092.

199574
MANEUVERING CHARACTERISTICS OF TANKERS, EFFECT OF DIFFERENT BALLAST DISPLACEMENTS ON SHIP PERFORMANCE

Eda, R Klosinski, WE

Stevens Institute of Technology, Davidson Lab, Hoboken, New Jersey

Final Report, MA–RD–900–74008, July 1973, 41pp

A study was made to evaluate the effect of ballast displacements on tanker maneuvering performance. A series of rotating–arm tests were made using a 5.17 ft. long model of a 250,000 DWT tanker to determine the necessary hydrodynamic coefficients for maneuvering motion predictions. Predictions of trajectories in entering turns, in Z–maneuvers, and

in spiral maneuvers, indicate that the lightest loading condition (30% load) among the three conditions examined in this study possess the best overall maneuvering performance in calm water. An analysis based on the strip theory was made to estimate oscillatory yaw and sway motions in regular waves. Results indicate that the oscillatory yaw and sway motions are the lightest loading condition in quartering seas although the differences among the three conditions are not significant. It is expected that the lightest loading condition encounters the greatest difficulty in maneuvering under the presence of wind and wave disturbances.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—73—11469.

199575
SEAKEEPING TESTS OF A 250,000 DWT TANKER MODEL IN VARIOUS BALLAST CONDITIONS

Dalzell, JF Klosinski, WE

Stevens Institute of Technology, Davidson Lab, Hoboken, New Jersey

Final Letter Report, MA—RD—900—74009, July 1973, 45pp

The objective of the work was to produce model boats to aid in the evaluation of the effect of different ballast displacements on seakeeping behavior of a typical 250,000 DWT tanker. A series of tests were made at three headings in long vested irregular waves of two levels of severity. Additional parametric variations included four model displacement conditions and two speeds. Wave motions were of lower magnitude than would in general be expected. The most violent longitudinal motions occurred in bow seas. In general, the influence of ballast condition on motion magnitudes is not large. The incidence of propeller emergence appears worst in bow seas. Similarly, the effect of forward draft on keel emergence and the incidence of re—entry velocities greater than 17 ft/sec is very strong. It is apparent from the head sea relative motion results that the model was on the verge of supercritical operation on the model seas. This is important from the point of view of data interpretation and eventual design conclusions.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, COM—73—11468.

199580
A RESEARCH AND DEVELOPMENT PROGRAM TO IMPROVE INSHORE MANEUVERING MOORING AND DOCKING CAPABILITIES OF SUPERTANKERS

Taggart, R

Robert Taggart, Incorporated, Fairfax, Virginia

Final Report, NIRC—373—0600—412, Feb 1976

The study covered by this report was conducted to investigate the current and future capabilities of very large crude carriers to transport energy fuel between worldwide supply and demand points with maximum efficiency and with minimum probability of environmental desecration. The analysis reveals a discouraging downward trend in the capability of these ships to control their maneuvers in restricted waters with a concomitant increase in the probability of collisions, strandings and rammings which can result in excessive operational costs and inestimable damage to the marine environment. The factors involved in the degradation of self—control of large ships have been analyzed in detail with the conclusion that drastic steps are necessary to upgrade maneuvering performance capability. In Appendix A, the current state—of—the—art in the development of improved maneuvering, sensing, and control systems is reviewed. In Appendix B, there are extracted those elements of maneuvering control equipment that are particularly applicable to solution of the basic problem. From this analysis and review has evolved a research and development program aimed at demonstrating what can be accomplished in the way of improved capability in a supertanker currently scheduled for construction by the Bethlehem Steel Corporation, Shipbuilding Division. The program has been specifically tailored to the installation of sensors, control and powering equipment in this ship, conducting a test and evaluation program to show how the inshore maneuverng capability will be upgraded, and proving conclusively the cost and performance benefits that can be realized. It is strongly recommended that this program be initiated immediately and pursued at the highest priority to provide answers to some of the most critical problems facing the merchant marine and the nation.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—373—0600—412.

199584
MACHINERY CONTROL SYSTEMS: SYSTEM DEFINITION

Greene, CR Milano, G Tam, NK

Raytheon Company, Portsmouth, Rhode Island

Final Report, MA—RD—930—T76067, May 20, 1976

Automation of ship propulsion systems for unattended operation is an established practice in the international marine field. These systems have demonstrated cost savings through more efficient plant operation, increased system reliability and improved manpower utilization. The advent of microprocessors offers the potential of providing further improvements in reliability, easier maintainability, flexibility in accommodating variations in ship systems, and reduction in control system space and weight. This report documents the definition of a system for the application of direct digital control techniques implemented in microprocessors to the control of a marine boiler, and provides a cost analysis which shows the resulting machinery control system to be a cost effective approach to engine room automation.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—T76067.

199596
INTEGRATED SHIP SYSTEM: PHASE 1: SYSTEM DEFINITION: VOLUME III

Ginter, E Lewis, TE Johnston, HH Kohlmeyer, K

Sperry Rand Corporation, Marine Systems Division, Charlottesville, Virginia 22901

Appendix, MA—RD—930—74053, July 1974, 819pp

Appendices of the detailed final report containing technical and other pertinent data developed in conjunction with studies performed in defining a cost—effective Integrated Ship System incorporating computer based automation technology.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—74053.

199598
INTEGRATED SHIP SYSTEM: VOLUME IV: VLCC COST/BENEFIT ANALYSIS AND STUDY

Ginter, E Lewis, TE Johnston, HH Levine, S Perry, ID

Sperry Rand Corporation, Marine Systems Division, Charlottesville, Virginia 22901

Final Report, MA—RD—900—75059, June 1975

A study of the costs and benefits to be expected when an Integrated Ship System (ISS) incorporating computer based automation technology is installed aboard a Very Large Crude Carrier (VLCC). The ISS Configuration utilized for the purposes of this study is the Gas Turbine Tanker ISS defined in the Integrated Ship System Phase 1 Report, MA—RD—930—74052. Some adjustments in system configuration of the Gas Turbine Tanker ISS are made in order to make it applicable to the VLCC. The cost and benefits of the final ISS Configuration defined for the VLCC are evaluated through the use of a benefit—cost computer model which considers the many cost and productivity variables associated with the operation of a VLCC. Results of the study indicate that it is cost beneficial to apply the ISS concept to a VLCC.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—900—75059.

199648
A FEASIBILITY STUDY ON THE EVALUATION OF THE SPECTRAL OCEAN WAVE MODEL (SOWM) AS A TOOL FOR SHIP RESPONSE PREDICTION

Hoffman, D

Webb Institute of Naval Architecture, Glen Cove, New York 11542

NMRC—KP—179, Jan 1978, 107pp

The availabilty of a Heavy Weather Damage Avoidance System (HWDAS) aboard the S.S. LASH ITALIA provided an opportunity for a feasibility study of a method of verifying the forecast and hindcast spectra that are routinely produced by the Spectral Ocean Wave Model (SOWM) developed at the U.S. Navy's Fleet Numerical Weather Central (FNWC), Monterey, California. Full—scale response data obtained on a single westbound crossing from Kinetra, Morroco, to New York in January 1976, were compared with responses calculated from: 1) analytically obtained transfer functions for several responses and two typical loading conditions, and 2) FNWC forecast and hindcast wave spectra for a number of points on or near the ship's route. The agreement between the measured and calculated responses was found to be better than expected, particularly for the vertical acceleration at the bow. Predicted lateral acceleration and vertical bending amidships indicate reasonable trends, though absolute values differed somewhat from measured data. It is concluded that this unique approach, to the verification of the SOWM for application to ship behavior at sea, is sufficiently promising that further work should be pursued.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB286237/AS.

098613
FUEL CONSERVATION IN SHIP OPERATIONS

Zubaly, RB

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Technical Report, NMRC—KP—133, Jan 1975, 46pp

A study of ways to reduce fuel consumption by both short—term and long—term changes in operational practices has been made, using two typical North Atlantic container fleets as models. Fuel saving strategies are evaluated, all involving reductions in ship speed.

NTIS

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098622
ISSUES OF FINANCIAL PROTECTION IN NUCLEAR MERCHANT SHIP OPERATIONS

Murphy, AW

Atomic Industrial Forum, New York, New York 10016

Final Report, MA—RD—920—75048, 27 March 1975, 7406—7506, 95pp

Adequate financial protection against liability for builders and operators of nuclear powered merchant ships is a significant element in establishment of a viable nuclear merchant ship program. This report examines questions of liability, insurance and indemnity as they might effect the construction and operation of nuclear ships and recommends requirements of a legislative package which would assure adequate protection of the public in the remote event of a nuclear ship accident.

NTIS

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148497
IMPROVEMENT OF MARINE ADVISORIES AND OPTIMUM TRACK SHIP ROUTINGS. VOL I OF III

Sea Use Foundation, Seattle, Washington 98101

Final Report, MA—RD—940—76022, 7407—7601, Jan 1976, 65pp

This report covers the work of the SEA USE Marine Services Development Group undertaken to determine potential benefits that might be derived by the shipping community from improved marine forecasts and optimum track ship routings. It includes a cost/benefit analysis, a review of existing organizations and procedures with recommendations for improvement, a discussion of several procedures that might be pursued in investigating techniques for extending the range and validity of marine forecasts, a review of the need for improved synoptic weather reports from ships at sea including a suggestion for possible improvements and a review of the communication problems in the processing of weather reports and promulgation of forecasts. The results of an experimental marine advisory project conducted during 1975 with two participating tug—barge companies are reviewed and analyzed and recommendations are made for possible improvements in this system. The study concludes the improved marine advisories would be beneficial, the costs of such improved services are warranted, and that they can be developed by improving liaison with the users, formating products to meet their specific requirements and by concentrating on improving communications to and from ships at sea.

Maritime Administration

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148498
IMPROVEMENT OF MARINE ADVISORIES AND OPTIMUM TRACK SHIP ROUTINGS. VOL. II OF III

Sea Use Foundation, Seattle, Washington 98101

Final Report, MA—RD—940—76023, 7407—7601, Jan 1976, 275pp

This report covers the work of the SEA USE Marine Services Development Group undertaken to determine potential benefits that might be derived by the shipping community from improved marine forecasts. This volume contains reports on the history of the SEA USE Marine Service Development Group (Annex A); a report on the existing organizations and procedures for reporting environmental monitoring and issuing marine forecasts for the Northeast Pacific Ocean region along with recommendation for improvements in services (Annex B); and a report on the use of tele— communications in reporting environmental monitoring and disseminating marine forecasts and advisories in the Northeast Pacific Ocean region (Annex C). It also contains suggested courses of action for improving medium range surface weather forecasts (Annex D) and a discussion of procedures for forecasting surface winds and related sea and swell (Annex E); as well as procedures for improving the capability for forecasting coastal fog (Annex F).

Maritime Administration

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148499
IMPROVEMENT OF MARINE ADVISORIES AND OPTIMUM TRACK SHIP ROUTING. VOL. III OF III

Sea Use Foundation, Seattle, Washington 98101

Final Report, MA—RD—940—76024, 7407—7601, Jan 1976, 148pp

This report covers the work of the SEA USE Marine Service Development Group undertaken to determine potential benefits that might be derived by the shipping community from improved marine forecasts. This volume contains reports on ice predictions for the Bering, Chukchi, and Beaufort Seas with recommendations for improving the service (Annex G1); a report on the special services provided by the SEA USE Marine Service Development Group to the tug—barge operators involved in the 1975 North Slope resupply operation (Annex H). It also contains a report and analysis on the trial of an experimental marine advisory service that was conducted in cooperation with two tug—barge companies operating on the Puget Sound to Alaska route with recommendations for improving this specific service (Annex I); and contains an analysis of potential benefits to optimum track ship routing services on the West Coast to Japan trade route from enhanced marine weather forecasting (Annex J).

Maritime Administration

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166274
STATUS OF RELIABILITY AND MAINTAINABILITY TECHNOLOGY IN USE IN THE U.S. MERCHANT MARINE

McCarthy, T Wysocki, WJ

ARINC Research Corporation, 2551 Riva Road, Annapolis, Maryland 21401

Summary Report 7, NMRC—KP—171—1, 604—7609, Sept 1976, 99pp

This report summarizes the reliability and maintainability procedures used in the U.S. merchant marine community; describes the acquisition process for shipboard electronic equipment as it relates to reliability and maintainability; describes the interrelationship of marine organizations; and provides an analysis of previous research in the field of reliability and maintainability of marine equipment, in order to determine the applicability of such research to the Reliability/Maintainability Program currently being sponsored by the Maritime Administration. A literature survey list and bibliography are presented in Appendix D.

NTIS

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166387
PROGRAM MANAGEMENT PLAN: RELIABILITY AND MAINTAINABILITY IMPROVEMENT PROGRAM FOR THE U.S. MERCHANT FLEET

McCarthy, T Packard, SD

ARINC Research Corporation, Santa Ana, California

NMRC—KP—171—3, 7604—7704, May 1977, 48pp

The report discusses the need for a Reliability and Maintainability Improvement Program for the U.S. merchant shipping industry. The report provides an overview of the entire program, describes the management and technical approaches to be used, describes each phase of the program, and describes the expected benefits of the program.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—268565/9ST.

173661
SHIPBOARD MAINTENANCE AND REPAIR SYSTEM, BASIC SYSTEM DESIGN AND DIESEL PLANT PROTOTYPE

Johnson, PF Kelly, RE Viele, JW

Pacific Gulf Marine, Incorporated, 4450 General DeGaulle Drive, New Orleans, Louisiana 70114

Final Report, Aug 1977, 163pp

This report is on progress towards development of a shipboard maintenance and repair system to meet the needs of the industry and U.S. Coast Guard requirements. Based on inputs from operators, a basic system design was developed and a diesel—plant prototype system was produced and installed on board the dry—bulk carrier MV SUGAR ISLANDER (unattended diesel plant). During the one—year evaluation, a series of casualties and extended shipyard periods prevented full system usage and limited collection of data. As a result, report conclusions and recommendations are tentative. Accomplishment of preventive maintenance actions, although limited to 38 percent of total requirements, resulted in timely discovery of deteriorated machinery conditions with an estimated cost benefit of $40,800. ADP—operated machinery history and spare parts inventory control subsystems worked well and provided valuable data to ship and shore M&R managers. System users appraised the system as needed to get away from breakdown maintenance, to promote maintenance program continuity, and to provide effective methods for both shipboard and shore management of M&R. Recommendations are to continue system evaluation under the total—ship prototype project (Contract No. 7—38014), inform industry of results to date, and continue development for gas turbine plants and other cargo types.

NTIS

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199304
MEASURING THE PRODUCTIVITY OF U.S. SHIPPING FIRMS 1966—1970

Katz, H Fettner, L

Merchant Marine Academy, Kings Point, New York

Final Report, NMRC—KP—110, Sept 1973, 157pp

The focus of this study is the shipping company as an operating unit, and the industry as a whole. The study examines the relationship between the shipping company and its environment. The environment includes such things as the nature of the market or markets within which the firm is operating and the amount and type of competition which it faces within these markets. Other environmental factors are the changing technological requirements for operation with new developments such as containerization, institutional arrangements such as conferences which affect a firm's operating procedures, and government policies and regulations.

NTIS
Maritime Administration

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199307
ANALYSIS OF LNG MARINE TRANSPORTATION FOR THE MARITIME ADMINISTRATION: VOLUME II

Donovan, LJ

Booz Allen Applied Research, Incorporated, 4330 East West Highway, Bethesda, Maryland 20014

Appendices, MA—RD—900—74040—A, 325pp

Contents: Supply/price analysis of natural gas and alternate substitute fuels; natural gas scenario analysis; cost analysis of first—generation LNG ship designs; liquefied natural gas transportation system evaluation model; environmental and regulatory considerations; second—generation concept descriptions; facilities support program.

NTIS
Maritime Administration

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199375
WORLD TANKER SUPPLY/DEMAND ANALYSIS 1975—1985

Jones Bardelmeier & Company Ltd., Nassau, Bahamas

Final Report, J—64—W, Dec 1973

This study concludes that the demand for tankers will not reach the heights forecasted nor will the supply of tankers continue to grow at present newbuilding rates. Furthermore, the study predicts that the demand for tankers will stabilize by 1979 at a level below that forecasted for 1980 and gradually decline thereafter.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number J—64—W.

199376
A STUDY TO IMPROVE PRODUCTIVITY IN GREAT LAKES IRON ORE VESSEL TRANSPORTATION

Jones Bardelmeier & Company Ltd., Nassau, Bahamas

Final Report, J—64—S, Feb 1974, 71pp

This study examines and develops alternative methods for vessel transportation beyond those presently in use between Lake Superior and the lower lake unloading facilities, with emphasis on the economics of unloading ore at South Chicago, Detroit, and at the principal Lake Erie ports. Particular attention is directed toward the Cleveland upriver movement, where navigational restrictions impose severe limitations as to size and type of vessel usable. The overall objective is to assess the net transportation cost per ton of iron ore delivered at lower lake facilities, using optional methods of transportation for the restricted inner harbor areas. Three concepts have been studied, with the aim of reducing transportation costs for Lake Superior iron ore delivered to lower lake ports.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number J—64—S.

199377
REPORT ON THE INTERCOASTAL MOVEMENT OF U.S. FOREST PRoDUCTS FoR THE U.S. MARItIME ADMINIStrAtIoN

Jones Bardelmeier & Company Ltd., Nassau, Bahamas

Final Report, J—64—R—C.2, Aug 1974, 139pp

The purpose of this report is to determine the economic viability of a U.S. flag shipping operation for the transportation of forest products. This second phase completes the JBC contract with MARAD and is an expansion of the work completed for Phase I. The objectives for both phases are to: 1) determine if there is forest product industry interest in developing a more efficient intercoastal sea service, 2) review the latest world—wide marine innovations, and 3) deterine if the new technology can be interpolated into a viable American flag operation. The report is divided into four major sections: 1)methodology, 2) demand, 3) supply, and 4) analysis.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number J—64—R—C.2.

199378
GREAT LAKES AUTOMOBILE CARRIER STUDY

Jones Bardelmeier & Company Ltd., Nassau, Bahamas

Final Report, J—64—G, July 1974, 11pp

This study concludes that the reintroduction of car carriers into Great Lakes service could provide transportation cost savings. Specific discussions are aimed at: 1) the volume of auto, truck, tractor, and other wheeled vehicle distribution traffic that could be captured, and 2) the vessel types, sizes, and capacities that would suit the requirements of 1).

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number J—64—G.

199382
COMPARATIVE ECONOMICS OF U.S. VERSUS FOREIGN FLAG SHORT ROUTE SHUTTLE CARRIERS IN THE CRUDE OIL TRADE

Jones Bardelmeier & Company Ltd., Nassau, Bahamas

Final Report, J—64—C, June 1974, 27pp

This report analyzes the relative costs of shipping crude oil over shuttle routes of 100 to 1,000 n.m. using a range of competitive tanker types. Conclusions are: 1) that while U.S. flag shuttle tankers cannot under cut the cost of transportation by equivalent foreign flag tanker, the excess cost is relatively small, 2) U.S. flag vessels are competitive by as much as $4,000,000 present value dollars, however, this situation is completely reversed should the foreign flag financing period be stretched from 8 to 16 years, and 3) for shuttle routes of those tankers analyzed, the most economic transportation mode for shuttle routes was the third generation tug/barge unit, although as would be expected the second generation unit produced lower costs on the very short route.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number J—64—C.

199411
DEVELOPMENT OF A DOMESTIC WATERBORNE FEEDER SYSTEM

Booz Allen Applied Research, Incorporated, 4330 East West Highway, Bethesda, Maryland 20014

Final Report, SLS—4—D, Dec 1976, 129pp

A study of a coastwise shipping service in the U.S. Gulf and Atlantic Coasts contains the following elements: 1) definition of potential market, 2) analysis of service requirements and competitive factors, 3) definition of candidate systems, 4) evaluation of market penetration, 5) cost analysis, 6) evaluation of the legal environment, 7) analysis of economic impact.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number SLS—4—D.

199458
LASH BARGE TOWING AND FLEETING PROGRAM DEFINITION STUDY

Todd Shipyards Corporation, Research and Technical Division, Galveston, Texas

Final Report, NMRC—275—53400—R1, Feb 1976, 40pp

This report provides the results of a study conducted to determine the problems associated with the towing and fleeting of LASH barges. Recommended programs for providing solutions to the various problems are offered as part of a project to increase the efficiency of LASH barge operations within the coastal and inland waterways of the Continental United States. These include programs to study the economic and operational capabilities of currently developed false bows and linkage systems; standardization and improvement of LASH barges; and upgrading identification markings.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—275—53400—R1.

199479
U.S. FLAG BULK SHIPPING

Temple, Barker & Sloane, Incorporated, Wellesley Hills, Massachusetts 02181

Final Report, M—3—US, Aug 1976, 224pp

Contents of this report were assembled in connection with the 1976 National Assessment and Planning Conference on U.S. Flag Bulk Shipping held in Hyannis, Mass. The Text provides background information on U.S. bulk shipping and the opportunity that exists for building and operating vessels under the American flag.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr PC: Req. Price, PB—257—402.

199484
FINANCIAL INFORMATION AND RETRIEVAL SYSTEM

Peat, Marwick, Mitchell & Company, Incorporated, Washington, DC 20036

Conceptual Design Report, P—35—F, Dec 1975, 94pp

The Financial Information and Retrieval System (FIRST) will provide MARAD with an automated system to accept and store vessel operator reported data. FIRST will perform three major functions: data entry and transmission, data base update and maintenance, and reporting.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number P—35—F.

199489
SHIP OPERATION AUTOMATION, II: VOLUME V.

Pitkin, M Roche, JJ Williams, TJ

North—Holland Publishing Company, Amsterdam, ISBN

Symposium Report, I—55—S—1976, Aug 30—Sept 2, 1976

The papers presented report on all aspects of ship operations automation as it has developed, including the latest developments in bridge design to allow efficient operation by one and two man bridge watchers. They cover new and improved navigation techniques for course keeping, for heavy weather avoidance, and for safe harbor and estuary transit avoiding possible collisions and groundings.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number I—55—S—1976.

199492
SHIPPING OPERATIONS INFORMATIONS SYSTEM (SOIS) SEMIANNUAL REVIEW MEETING

Computer Sciences Corporation, 6565 Arlington Blvd, Falls Church, Virginia 22046

Final Report, C—65—S, Nov 12—13, 1974

The meeting addressed the following topics: 1) National Shipping Management System, 2) Export Booking and Billing System, 3) Marine Terminal Control System, 4) MARAD Satellite Navigation/Communication Program, 5) Shipping Data Communications Study, 6) Barge Equipment Control System, 7) New Program Initiatives, and 8) Maritime Terminal Control System.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number C—65—S—Nov. 1974.

199493
SHIPPING OPERATION INFORMATIONS SYSTEM (SOIS) MARITIME DATA COMMUNICATIONS STUDY

Computer Sciences Corporation, 6565 Arlington Blvd, Falls Church, Virginia 22046

Final Report, CSC—TR—75—4421, May 1975

Four major aspects of shipping management which were identified as areas in which advanced software would be most useful are: cargo space documentation, intermodal distribution coordination, fleet resources management, and maritime industry reporting.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number CSC—TR—75—4421.

199556
THE APPLICATION OF SLURRY TECHNOLOGY TO THE MARITIME INDUSTRY

Marconaflo, Incorporated, San Francisco, California 94111

Appendix, MARCO—3—A—App, May 31, 1976

This appendix contains computer listing of mixing tests, computer plots, and computer listing of settling tests. It is the appendix to "The Applications of Slurry Technology to The Maritime Industry."

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MARCO—3—A—App.

199573
COST INFORMATION REPORTING SYSTEM, U.S. MARITIME INDUSTRY

Peat, Marwick, Mitchell & Company, Incorporated, Washington, DC 20036

User's Manual, P—35—C, Dec 1974, 150pp

This user's manual is a guide to the capabilities and operation of the Cost Information Reporting System (CIRS) which has been developed by MARAD and the Federal Maritime Commission (FMC). The manual addresses many basic questions about CIRS, such as: 1) the fundamental objectives of the system; 2) cost information reported to the system; 3) accompanying statistical information; 4) how the information is used; 5) the reporting cycle; 6) reports produced; and 7) recommended changes.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number P—35—C.

199578
BULK COMMODITIES FORM CHANGES AND ALTERNATIVE TRANSPORTATION MODES: PHASE 2: VOLUME III

Ingalls Shipbuilding Division of Litton Industries, Pascagoula, Mississippi 39567

Appendices, ISC—CAM—728, Dec 31, 1973

The appendices cover: A. Tests on Slurry Characteristics of Phosphate Rock; B. Study of Hydraulic Transportation and Dewatering Characteristics of a Coking Coal; C. Excerpts from Williams Brother Engineering Company Reports on Coal Slurry Pumping Tests; D. Excerpts from Colorado School of Mines Research Institute Report on Coking of Slurried Metallurgical Coal; E. Studies by MARCONA Corporation; F. Mapping of San Blas, Panama Route for Trans—Isthmus Pipeline and Terminal System; G. Mapping of Northern Costa Rica Route for Trans—Isthmus Pipeline and Terminal System; H. An Algorithm for MONO—Mooring Buoy Anchor System Design; I. A Program for Trade Route Cost—Sensitivity Analysis; K. Parametric Ship Design Program; L. Financial Model Description and User Manual; M. Ship Design Plans; N. Cargo Handling Plans; O. Presidential Proclamation on Oil Imports; P. Export Coupons — A System to Promote; Q. Trade Route II — Phosphate Rock Slurry to Mediteranean Crude Oil Return.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number ISC—CAM—728.

199581
EXECUTIVE SUMMARY BULK COMMODITIES FORM CHANGES AND ALTERNATIVE TRANSPORTATION MODES: PHASE 2: VOLUME I

Ingalls Shipbuilding Division of Litton Industries, Pascagoula, Mississippi 39567

Final Report, MA—RD—930—76028, Dec 31, 1973

The purpose of this investigation was to identify and develop means of reducing transportation and handling costs of bulk commodities through form change and alternative transport modes and to incorporate these improvements into ocean transport systems in which U.S. flag shipping would be maximally competitive with foreign flag operators. The study consisted of: 1) an investigative phase, in which the whole spectrum of possible approaches was explored and promising candidates were selected, and 2) a design phase in which a single system was developed to a level of detail suitable for presentation to industry. The system proposed is based upon a dual—pipeline system across Central America suitable for about 8 million tons per annum of slurried coal westbound and about 9 million tons of crude oil eastbound. The report provides a complete engineering analysis, including limited scale coal slurry experiments, of the pipeline systems, shoreside handling, pipelines and storage facilities, and a comprehensive design for Atlantic and Pacific fleet ships to handle these commodities in a backhaul mode of operation. The system will serve the U.S.—Japan coal trade and the transport of Alaskan crude to East Coast refining and distribution centers. A complete market and financial analysis is presented, showing that rates competitive with existing and potential foreign flag shipping can be achieved with only the construction differential subsidy now provided by law. Finally it is concluded that this subsidy would be recovered by the United States through rebate and tax revenues in the first 20 years of system operation. The report also describes general approaches and specific analytical tools under which further studies of ocean transport systems can be carried out. The report contains three volumes. Volume I presents a summary of the investigation, Volume II is the technical report, and Volume III contains the appendices.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—76028.

199582
SHIP MAINTENANCE AND REPAIR PROGRAM PLAN

Gleason, DS Hautanen, RW

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—273—32000—R1, Dec 1973

This report presents the program plan for ship maintenance and repair projects. It is designed to serve as the basic program plan document for the reduction of vessel maintenance costs and ship downtime. The report was originated to adhere to the need for an overall plan, to identify and control the numerous projects presently underway at the research centers and within headquarters. The report describes the basic steps used in formulating the plan, and establishes the schedules for the various work projects. It also introduces future areas of work for project development.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—272—32000—R1.

199587
THE DEVELOPMENT OF A MARINE STANDARDS PROGRAM AT NMRC — GALVESTON

Anderson, AL

National Maritime Research Center, Galveston, Texas 77550

Final Report, NMRC—273—36000—R1, Nov 1974, 147pp

This report presents a survey of the existing standards and regulations used by the marine industry. A brief introduction is given on the definitions and purposes of standards and specifications. The prominent standards societies are identified according to origin, organization, work production, and industrial participation. The potential benefits of a coordinated industry/government standards development program are described along with benefits to the maritime community. An examination of research and development within the U.S. marine industry is provided including that of shipbuilders, academic institutions, non—profit organizations, and the federal government to further illustrate the need for a joint industry/government standards program. The importance of frequent updating of standards and regulations is emphasized. Based on the information above, a program plan for the development/improvement of marine standards is devised.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—273—36000—R1

199597
A BIBLIOGRAPHY OF COMMERCIAL SHIP OPERATION AUTOMATION

Williams, TJ

Purdue Laboratory for Applied Industrial Control, West Lafayette, Indiana

Periodic Report, MA—RD—930—75041, Feb 1975, 449pp

This report presents a listing of the papers, reports, and books on the subject of ship operation automation which have been available in the United States or have been called to the attention of investigators there. These publications are classified according to a set of major and subsidiary subject headings covering the field. A summary text and an author index also are included. A large part of the literature entries are accompanied by abstracts. Approximately 1900 entries have been covered.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—75041.

199599
ECONOMICS OF SHIP OPERATION AUTOMATION: VOLUME II

Whybark, DC Williams, TJ

Purdue Laboratory for Applied Industrial Control, West Lafayette, Indiana

Final Report, MA—RD—930—76016, Nov 1975

This report presents the results of an extensive study of the economics of ship operation automation through contacts with ship owners and operators, ship builders, and equipment suppliers in many parts of the world. These contacts were supplemented and extended with extensive computer simulations of typical ship voyages for four classes of modern merchant shipping: coastal tankers, crude tankers operating to the Persian Gulf, transoceanic RO/RO vessels, and modern container ships on Far East service. Further, extensive reliability analysis simulations were carried out to determine the necessary capabilities needed for the proposed digital computer based integrated control system also included in this report.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—76016.

199602
SHIPPING OPERATIONS INFORMATION SYSTEM NETWORK DEVELOPMENT PROJECT

Choate, T

General Electric Company, 1755 Jefferson Davis Highway, Arlington, Virginia 22202

Final Report, Sept 1978

This report describes the activities carried out to promote acquisition and installation of computer software modules development in MarAd's Shipping Operations Information System (SOIS) by member companies of the U.S. flag shipping industry. Principal efforts included the conversion and installation of six modules on the GE commercial computer network and the development of informational materials to depict the benefits of utilizing the various SOIS modules.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr.PC:Req. Price, PB290157/AS.

199606
OPTIMIZATION OF SHIP ROUTING: APPENDIX E: COMPUTER PROGRAM DOCUMENTATION AND LISTING

Frankel, E Chen, H

Massachusetts Institute of Technology, Cambridge, Massachusetts

Appendix, NMRC—KP—167E, July 1978, 48pp

This appendix contains the computer program documentation and listing for report "Optimization of Ship Routing."

Maritime Administration

This document is available for review at the Departmentof Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number NMRC—KP—167E.

199607
OPTIMIZATION OF SHIP ROUTING

Frankel, E Chen, E

Massachusetts Institute of Technology, Cambridge, Massachusetts

Final Report, NMRC—KP—167, July 1978, 107pp

An atomated system for optimal ship routing is presented in this report. The optimal ship routing is essentially treated as a dynamic control process of a multi—stage, stochastic nature under the constraints of operational requirements, ocean environmental conditions and ship dynamic response characteristics.

NTIS
Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC:Req. Price, PB286215/AS

199654
SHIPBOARD MAINTENANCE AND REPAIR SYSTEM: BASIC SYSTEM DESIGN AND PROTOTYPE

Johnson, PF Kelly, RE Pohle, CG

Pacific Gulf Marine, Incorporated, 4450 General DeGaulle Drive, New Orleans, Louisiana 70114

Final Report, MA—RD—920—78042, April 1978, 196pp

This is a final report on the design and development of a prototype shipboard maintenance and repair system to meet the needs of industry and the requirements of the U.S. Coast Guard. Based on inputs from operators, a basic system design was developed and an initial prototype system for a diesel engineering plant was produced and installed aboard the MV SUGAR ISLANDER (unattended engine room). The diesel plant prototype was evaluated over a one year period, following which the system documentation and procedures were expanded to total ship applicability to include hotel service equipment, ship control and navigation equipment, electronics, and items associated with the hull, holds, tanks, and cargo stowage. System design includes documentation for scheduling and recording accomplishment of required preventive maintenance items, corrective maintenance actions, spare parts usage and requisitioning, and ADP produced machinery history and spare parts inventory. Systems users appraised the system as beneficial in avoiding breakdown maintenance, maintaining maintenance program continuity,

and in providing effective methods for both ship and shore management of M & R. Preliminary cost and man/hour analysis indicate positive trends toward cost reduction in the areas of shoreside maintenance, spare parts, and overtime, and a beneficial re-orientation of management man/hour requirements. Continuing data acquisition is recommended to validate the effects of the system on the costs cited and to develop methods for identification of failure rates, spare parts usage rates and other management and budget forecasting information.

NTIS
Maritime Administration

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084820
LEAKAGE THROUGH CRACKS IN LNG TANKAGE

Davies, LG Durfee, RL Fourney, WL Gift, RD

Versar, Incorporated, 6621 Electronic Drive, Springfield, Virginia

Final Report, 31 May 1974, 91pp

An experimental and theoretical investigation of leakage through fatigue induced cracks in cylindrical test vessels was conducted. Test vessels were constructed from two aluminum alloys and 9% nickel steel. Experimental and theoretical leak rate vs pressure curves are presented and compared. The generally higher values of leak rate predicted by the theory are explained on the basis of the observed crack geometry. Recommendations are made for predicting leakage through fatigue cracks in tanks.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: $4.75 Com—74—11630/2GA; Microfiche $2.25.

166734
THE MEASUREMENT OF HULL AND LINE SHAFT STRESSES IN RESPONSE TO CRANE AND SEA STATE LOADINGS, S.S. PHILIPPINE BEAR

Battilana, WW Wallace, LF

Avondale Shipyards, Incorporated, New Orleans, Louisiana

317pp

Approximately eight weeks of wave, trim, and cargo induced stress data were obtained on a single LASH—type cargo vessel operating in the Gulf of Mexico, the U.S. Pacific West Coast, and the South Pacific Ocean to Australia. Data were taken from strain gages mounted on hull longitudinal and transverse members in the inner bottom structure, on the shaft thrust bearing casing and foundation, and on the lower main gear case and foundation, as well as strain gage telemetry units mounted on the rotating propeller shaft. Specific hull and shafting response was ideally measured during short—term loading to two—million pounds by means of the vessel cargo handling lighter crane. Additional measurements of deflection were taken by means of a jig transit, linear variable differential transducers (LVDTs), strain gage deflectometers, and a laser alignment system.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—269303/4ST.

168787
FRACTURE BEHAVIOR OF THE HEAT AFFECTED ZONE IN 5% NI STEEL WELDMENTS

McHenry, H Reed, RP

Maritime Administration, Washington, DC 20230

Final Report, April 1977, 9pp

The fracture properties of the base metal and the heat affected zone (HAZ) of 5% Ni steel weldments were determined at room temperature, 111k and 76K; emphasis was placed on tests at 111K, the minimum boiling point of liquefied natural gas (LNG). The 32 mm—thick test plates, which met the requirements of ASTM A645, were welded using the pulsed—power gas—metal—arc process at a heat input of 10.6 kJ/cm. The fatigue crack growth rates were determined for cracks growing through the thickness using four—point bend specimens. At 111K, the rates in the base metal were essentially the same as found by other investigators, however, the rates in the HAZ were up to 10 times faster than previously reported. Fracture toughness tests were conducted under load—controlled conditions using J—integral procedures. At 111K, the base metal and HAZ toughness values were 30 and 50 percent lower, respectively, than toughness values obtained previously for the same plate of test material under displacement—controlled conditions. Fracture mechanics analyses using the results reported herein indicate that 5% Ni steel is suitable for LNG applications, but more conservative estimates of fatigue life and critical crack size are necessary.

NTIS

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168871
PHOTOELASTIC STUDIES OF CRACK PROPAGATION AND CRACK ARREST

Irwin, G Dally, JW Kobayashi, T Fourney, WL Etheridge, JM

University of Maryland, College Park, Maryland 20742

NUREG—0342, Oct 1977, 283pp

This report describes the third—year effort on research programs dealing with the characterization of dynamic aspects of fracture. The results included in this report are as follows: (1) verification of BCL one—dimensional computer code; (2) determination of a — K relationship from modified compact — tension specimen; (3) verification of the MRL procedure for K(Ia) measurement with machine—loaded C—DCB specimen; (4) fracture behavior in duplex specimens; (5) crack propagation in a thermally stressed ring specimen; and (6) development of a two—dimensional code.

NTIS

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: NTIS, Repr. PC: Req. Price, PB—272645/3ST.

179651
CORROSION FATIGUE OF CAST PROPELLER ALLOYS IN FLOWING SEAWATER

Jaske, CE Utah, DA Boyd, WK

Battelle Columbus Laboratories, Columbus, Ohio 43201

Final Report, MA—RD—920—77085—A, 7301—7707, July 1977, 96pp

The corrosion fatigue results of bronze alloys—(1) manganese, ABS Type 2, (2) nickel—aluminum, ABS Type 4, and (3) manganese—nickel—aluminum, ABS Type 5 are presented. Some results on CA—6NM stainless steel are also given. The large Krause type plate—bending specimens are from large castings to simulate those from ship propellers. Fatigue experiments were carried out for various mean and alternating stress levels at 3.33 HZ. Stress versus number of cycles to failure (S—N) between 1,000,000 and 10 to the 8th power cycles are given for the three bronzes, which includes the effect of mean stress levels. The mean stress effects could be well accounted for by the use of the Smith stress—strain parameter. Results are discussed in terms of alloy and published information. Application of the results to design is also addressed.

NTIS

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199453
HULL STRUCTURE – PROPULSION SYSTEM INTERACTION OF THE LASH (C8–S–8LB) VESSELS

Avondale Shipyards, Incorporated, New Orleans, Louisiana

Final Report, MA–RD–940–T76071, July 1976, 100pp

This calculation and measurement of the stresses and deflections of the hull, machinery and foundations of a LASH ship was conducted with the objectives to (1) further the state of the art by gaining knowledge of the structural problem which has been known to occur on tankers and bulk carriers in the past, and (2) prove that the finite element structural technique is suitable for the future prediction of levels of stresses and deflections which may be incompatible with the ships machinery and power transmission. Agreement between the theoretical and experimental results adequately demonstrated the achievement of the objectives.

Maritime Administration

This document is available for review at the Department of Commerce, main Commerce Building, Room 4884, Washington, DC, under reference number MA–RD–940–T76071.

199468
HULL STATUS MONITORING AND SURVEILLANCE SYSTEM: PHASE I: SYSTEM DEFINITION

Snow, AB Berbert, AG

United States Lines, Incorporated & Technology Incorporated, New York, New York & Dayton, Ohio

Final Report, MA–RD–930–75015, Jan 1975, 69pp

This report describes the initial effort in the implementation of a hull status monitoring and surveillance system. This system is intended to aid the conning officer in decision making. The initial effort resulted in the definition of a system to aid in decision regarding stability, performance, hull stress amd slamming, and damaged stability. System concepts, functional properties, performance characteristics, hardware, and software are discussed.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA–RD–930–75015.

199488
RECTANGULAR VENT DUCT STANDARDS

Todd Shipyards Corporation, Seattle, Washington

Final Report, T–6–NSRP–R, May 1977, 15pp

This report determines the reasons for using vent duct standards, concluding that: better defined ships' components minimize risks and costs for shipbuilders and their marine suppliers, as well as for owners and underwriters. Specific objectives were to: develop standard sizes and components for rectangular vent duct, and to identify potential cost savings from such installations.

Maritime Adminstration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number T–6–NSRP–R.

199554
NDT: LOW COST ALTERNATIVES TO FILM RADIOGRAPHY

Chirillo, L

Todd Shipyards Corporation, Seattle, Washington

Final Report, MA–RD–930–75076, Aug 1974, 154pp

The report is a comprehensive analysis of the current problem and cost related to NDT of weldments in ship hulls.

NTIS
Maritime Administration

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199649
HULL MONITORING SYSTEM: VOLUME I

Finch, R Gregov, B

United States Lines, Incorporated, One Broadway, New York, New York 10004

Final Report, MA–RD–920–78059, Aug 1978

This is a final report on the design and development of a prototype hull monitoring system (HMS) for use on merchant vessels. The overall objective of the HMS was to increase ship safety and to improve ship performance by generating appropriate information and recommendations through a minicomputer controlling strategically located sensors, information display consoles, and an interactive command console. For increased ship safety, the HMS monitored primarily ship stability, hull strength, cargo lashing strength, and flooding conditions. For improved ship performance, the HMS provided information leading to the optimum trim and levels in the roll–stabilization tanks with minimum ballast and assurance of hull structural integrity and intact cargo. The HMS operates in four main modes: CARGO, CRUISE, FUEL, and DAMAGE. The development program was conducted in three phases: Phase I, System Definition, beginning in May 1974; Phase II, System Design and Fabrication, beginning in June 1975; and Phase III, System Installation and Evaluation, beginning in October 1976. In Phase III, the HMS was installed on the SS AMERICAN AQUARIUS, a United States Lines Incorporated Lancer–class containership, for performance evaluation. In general, the HMS performed as intended. Recommendations are included for improving the reliability of sensor and operator inputs. This final report concludes Phase III. Included as appendixes are compiled data from the voyages, the Operating and Maintenance Manual for the HMS, and computer program descriptions and listings.

NTIS
Maritime Administration

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199673
GREAT LAKES CARRIERS HULL STRESS MONITORING SYSTEM

Webb Institute of Naval Architecture, Glen Cove, New York 11542

Final Report, Jan 1979, 130pp

The purpose of this study was to investigate the operations of Great Lakes carriers, particularly the stress problems these ships are likely to encounter, and the technological state of the art, and to make recommendations for a system that would be of use to ship operating personnel both in making them aware of worsening stress conditions and in providing them with information upon which to base corrective action. Specifications for a computerized digital system are presented. The system will incorporate video (CRT) graphical displays and use best available technology to advise of the consequences of alternative action.

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Maritime Administration

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044632
FOREIGN OCEANBORNE TRADE OF THE UNITED STATES CONTAINERIZED CARGO ON SELECTED TRADE ROUTES, CALENDAR YEAR 1970

Nale—Povic, JG

Maritime Administration, Washington, DC 20230

MA—STAT—522—73014 1972, 33pp

The document is one of a statistical series of reports on containerized cargo shipments released by the Maritime Administration for the information of industry and interested government agencies. The report is designed to cover those trade areas which have the highest concentration of container shipping. (Author)

Maritime Administration

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046106
INDEX OF CURRENT REGULATIONS OF THE MARITIME ADMINISTRATION, MARITIME SUBSIDY BOARD AND NATIONAL SHIPPING AUTHORITY. REVISED

Maritime Administration, Washington, DC 20230

MA—GEN—220—73022, Jan 1973, 49pp

A revised index lists current regulations of the Maritime Administration/Maritime Subsidy Board, National Shipping Authority, and Office of the Maritime Administrator. The regulations prescribe rules and procedures with which the maritime industry must comply.

Maritime Administration

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046110
FOREIGN OCEANBORNE TRADE OF THE UNITED STATES. YEAR 1971

Nale—Povic, JG

Maritime Administration, Washington, DC 20230

MA—STAT—522—73021, Feb 1973, 51pp

The document is one of a statistical series of reports on containerized cargo shipments released by the Maritime Administration for the information of industry and interested government agencies. The report is designed to cover those trade areas which have the highest concentration of container shipping. (Author)

Maritime Administration

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047662
ESSENTIAL UNITED STATES FOREIGN TRADE ROUTES

Maritime Administration, Washington, DC 20230

June 1975, 81pp

The report enumerates those trade routes, areas, and services which the Maritime Administration has determined to be essential for the promotion, development and expansion of the nation's foreign commerce. The publication lists the export/import tonnage of major commodities moving on the trade routes, and breaks down the totals by type of service (liner, non—liner, tanker). Also included are maps indicating the trade routes, a list of major U.S. flag shipping companies serving each route, a short glossary of ocean shipping terminology, listings of U.S. steamship lines, and commodities moving over them. This booklet provides information basic to an understanding and appreciation of the importance of the contribution made by the U.S. Merchant Marine to U.S. trade.

Maritime Administration

TO PURCHASE COPIES OF THIS DOCUMENT WRITE TO: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402

138354
A SHORT TERM FORECAST OF U.S. OCEANBORNE EXPORTS

Temple, Barker & Sloane, Incorporated, Wellesley Hills, Massachusetts 02181

MA—GEN—379—76044, Feb 1976, 209pp

The purpose of this study is to project the short—term trends in U.S. exports by vessel. The economic recession experienced by most parts of the world is a major factor influencing trade volumes, and the study analyzes its impact on the key segments of the U.S. export trade.

NTIS

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146761
NATIONAL ASSESSMENT AND PLANNING CONFERENCE ON U.S. FLAG BULK SHIPPING, JULY 12—14, 1976

Temple, Barker & Sloane, Incorporated, Wellesley Hills, Massachusetts 02181

MA—GEN—960—77013, 73pp

The report presents the results and suggestions for improving the U.S. flag bulk shipping operations. Objectives of the conference and results covered are: to promote understanding of the issues that influence U.S.—flag participation in bulk trades, to increase shipper awareness of available government aids designed to stimulate U.S.—flag dry bulk shipping, and to provide individual comments to MarAd.

NTIS

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166378
FORECASTING MARINE TRANSPORTATION REQUIREMENTS FOR IMPORTS TO MIDDLE EASTERN OIL—EXPORTING COUNTRIES: 1976—1985. VOLUME 1. EXECUTIVE SUMMARY

Abolfathi, F Keynon, G Hazlewood, L Harvey, W Hleihel, S

CACI, Incorporated, 1815 North Fort Myer Drive, Arlington, Virginia 22209

Final Report, MA–RD)940–77081, May 1977, 22pp

The study presents tonnage forecasts of trade between the United States and Middle East OPEC members for 1980 and 1985. OPEC imports are divided into 18 commodity groups and non–petroleum exports into five groups. Each OPEC member's total trade is considered first and market shares are used to identify U.S. participation. The transport systems, particularly ports and related infrastructure, of each OPEC country are described. Planned and probable expansions are compared to the handling requirements given by the trade forecasts.

NTIS

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166379
FORECASTING MARINE TRANSPORTATION REQUIREMENTS FOR IMPORTS TO MIDDLE EASTERN OIL–EXPORTING COUNTRIES: 1976–1985. VOLUME 2. RESEARCH FINDINGS

Abolfathi, F Keynon, G Hazlewood, L Harvey, W Hleihel, S

CACI, Incorporated, 1815 North Fort Myer Drive, Arlington, Virginia 22209

Final Report, MA–RD–940–77082, May 1977, 114pp

The transport systems, particularly ports and related infrastructure, of each OPEC country are described in detail. Planned and probable expansions are compared to the handling requirements given by the trade forecasts. Direct maritime routes and mixed–mode routes using transit ports and overland connections are employed to assess probable future congestion conditions. The report includes a comparison of freight rates from U.S. and North European ports. Prospects for the Suez Canal are also examined. Volume II presents the basic research findings for each OPEC country and for the countries as a group, with emphasis on trade with the United States.

NTIS

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166380
FORECASTING MARINE TRANSPORTATION REQUIREMENTS FOR IMPORTS TO MIDDLE EASTERN OIL–EXPORTING COUNTRIES: 1976–1985. VOLUME 3. APPENDICES

Abolfathi, F Keynon, G Hazlewood, L Harvey, W Hleihel, S

CACI, Incorporated, 1815 North Fort Myer Drive, Arlington, Virginia 22209

Final Report, MA–RD–940–77083, May 1977, 487pp

The transport systems, particularly ports and related infrastructure, of each OPEC country are described in detail. Planned and probable expansions are compared to the handling requirements given by the trade forecasts. Direct maritime routes and mixed–mode routes using transit ports and overland connections are employed to assess rates from U.S. and North European ports. Prospects for the Suez Canal are also examined. Volume III contains all supporting information for the study. It is the most detailed and the longest volume in the set.

NTIS

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199369
TECHNICAL REPORT BULK COMMODITIES FORM CHANGES AND ALTERNATIVE TRANSPORTATION MODES: PHASE 2: VOLUME II

Ingalls Shipbuilding Division of Litton Industries, Pascagoula, Mississippi 39567

Final Report, ISC–CAM–725, Dec 31, 1973

This report contains: The Study of Trade Route I, Trade Route II – Slurried Phosphate to The Mediterranean – Return with Algerian Crude, Second Iteration Study of World Bulk Trades.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number ISC–CAM–725.

199379
OBOs IN U.S. FLAG RATES FOR THE U.S. MARITIME ADMINISTRATION

Jones Bardelmeier & Company Ltd., Nassau, Bahamas

Final Report, J–64–O 1973, 18pp

This study finds two sets of existing trade flows, and a third which may arise in the future, amenable to the use of combination carriers. Also developed are cost per ton of carrying commodities by means of bulkers, tankers, and OBOs. Finally, for each movement the entities which ship and/or receive the commodity are identified.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number J–64–O.

199380
DEVELOPING NATIONS BULK FLEET GROWTH

Jones Bardelmeier & Company Ltd., Nassau, Bahamas

Final Report, J–64–D, July 1974, 25pp

This report addresses the results of a reopening of the Suez Canal with no tolls and no restriction on vessel size. Practical considerations such as toll structure, depth and size restrictions, sumed and other pipelines, and transit capability of the Canal were examined nonetheless. Conclusions were that: 1) global demand for tankers would be reduced by about 5%, and even less for dry cargo, 2) U.S. oil imports would require about 5% less tanker capacity, 3) the need for deepwater terminals off the East and Gulf coasts would not diminish, 4) there would be little effect on U.S. dry bulk trades, and 5) the market for vessels of under 100,000 dwt would strengthen. Because the U.S. is at present very dependent on this class of vessel for bulk imports and exports, transportation costs could rise.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number J–64–D.

199381
THE EFFECT OF A REOPENED SUEZ CANAL ON THE BULK TRADES WITH SPECIAL REFERENCE TO THE EFFECT ON U.S. BULK TRADES

Jones Bardelmeier & Company Ltd., Nassau, Bahamas

Final Report, J—64—E, May 1974, 23pp

This study discusses: 1) developing nations having the largest fleets, 2) OPEC, 3) other Middle East Nations, 4) other developing nations having or planning significant bulk fleets, 5) the effect of the growth of developing countries fleets on the U.S. flag fleet and trade, and 6) bilateral agreements between the U.S. and developing nations.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number J—64—E.

199412
A STUDY OF THE FUTURE REQUIREMENTS FOR SHIPS THAT WILL BE ENGAGED IN THE U.S. WORLD TRADE FOR BOTH THE SHORT AND LONG TERM

Temple, Barker & Sloane, Incorporated, Wellesley Hills, Massachusetts 02181

Executive Summary, T—44—S—ES, Mar 1, 1976

The result of this project is a forecast of ships serving the U.S. world trade for the years 1975 through 2000, presented in five—year increments. The fleet forecast is divided into eight different categories of ship type as defined by MARAD. Size groupings as defined by TBS are included within each vessel type. Also included are principal characteristics of ships as well as differentiation between the number of U.S. and foreign flag ships. Finally, the merchant fleet forecast is broken down by the four major U.S. coasts.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washingotn, DC, under reference number T—44—S—ES.

199413
A STUDY OF THE FUTURE REQUIREMENTS FOR SHIPS THAT WILL BE ENGAGED IN THE U.S. WORLD TRADE FOR BOTH THE SHORT AND LONG TERM

Temple, Barker & Sloane, Incorporated, Wellesley Hills, Massachusetts 02181

Final Report, T—44—S, Mar 1, 1976, 117pp

The result of this project is a forecast of ships serving the U.S. world trade for the years 1975 through 2000, presented in five—year increments. The fleet forecast is divided into eight different categories of ship type as defined by MARAD. Size groupings as defined by TBS are included within each vessel type. Also included are principal characteristics of ships as well as differentiation between the number of U.S. and foreign flag ships. Finally, the merchant fleet forecast is broken down by the four major U.S. coasts.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number T—44—S.

199465
TRANSPORT ANALYSES — GREAT LAKES AND SEAWAY: VOLUME III: SEAWAY AND OVERSEAS TRADE

Elste, VH Swift, PM Swigart, JE

Department of Naval Architecture and Marine Engineering, University of Michigan, Ann Arbor, Michigan

Final Report, MA—RD—930—75052, Dec 1974, 200pp

The operation of a variety of ship types involved in seaway and overseas trade is examined. These include Great Lakes and oceangoing bulk carriers, dry cargo ships, container ships and alternative container feeder vessels. Details of mathematical models are given for each ship type, and a set of designs is evolved for operation on different trade routes. A series of parametric studies illustrates the sensitivity of the ship's economic performance to changes in the operational characteristics. Alternative container feeder vessels for the Great Lakes/St. Lawrence system are presented and an apparently viable feeder vessel is proposed. Comparison is then made with competing rail services.

Maritime Administration

This document is available for review at the Department of Commerce, Main Commerce Building, Room 4884, Washington, DC, under reference number MA—RD—930—75052.

199501
TRADE OUTLOOK OF THE NORTHERN CALIFORNIA PORTS: YEAR 2000 AND BEYOND

Northern California Ports and Terminals Bureau, Incorporated, prepared by Policy Planning Consultants, San Francisco, California & Palo Alto, California

Final Report, MA—RD—970—T76069, Nov 1975, 171pp

The study is an analysis of the economic, political and technical forces that influence the development of ocean—borne trade and provide the basis for projections of various categories of dry cargo tonnages. The analysis indicated the relationship of world trade, United States trade, Pacific Coast trade, and the ocean—borne trade that passes through the ports of Northern California and the Golden Gate of San Francisco Bay. The projections made include prediction intervals to encompass variable forces that might operate in the future. Color illustrations reproduced in black and white.

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199609
U.S. FLAG TRANSPORTATION OF PERISHABLE IMPORTS AND EXPORTS: A MARKET ASSESSMENT: VOLUME III

MANALYTICS, Incorporated, 625 Third Street, San Francisco, California 94107

Appendices, M—3—USF—Vol.3, April 1978

This study concludes that the present market for refrigerated exports is limited by liner capacity constraints and trade barriers; the present ocean rates are not limiting. With unlimited refrigerated capacity and with gradual reductions in foreign trade barriers, by 1985 the export market could almost double in liner service and increase over 160 percent in nonliner service, and the import market could grow by 25 percent, requiring 1,650,000 long tons of added liner and nonliner capacity for U.S. exports, 600,000 long tons for U.S. imports.

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199610
U.S. FLAG TRANSPORTATION OF PERISHABLE IMPORTS AND EXPORTS: A MARKET ASSESSMENT: VOLUME II

MANALYTICS, Incorporated, 625 Third Street, San Francisco, California 94107

Final Report, M—3—USF—Vol.II, April 1978, 170pp

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199611
U.S. FLAG TRANSPORTATION OF PERISHABLE IMPORTS AND EXPORTS: A MARKET ASSESSMENT: VOLUME I

MANALYTICS, Incorporated, 625 Third Street, San Francisco, California 94107

Executive Summary, M—3—USF—Vol.I, April 1978, 20pp

This study concludes that the present market for refrigerated exports is limited by liner capacity constraints and trade barriers; the present ocean rates are not limiting. With unlimited refrigerated capacity and with gradual reductions in foreign trade barriers, by 1985 the export market could almost double in liner service and increase over 160 percent in nonliner service, and the import market could grow by 25 percent, requiring 1,650,000 long tons of added liner and nonliner capacity for U.S. exports, 600,000 long tons for U.S. imports.

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199671
MARKET ASSESSMENT FOR TRANSPORTATION OF TRADE WITH DEVELOPING COUNTRIES

CACI, Incorporated, 1815 North Fort Myer Drive, Arlington, Virginia 22209

Final Report, March 1979

The study supplements information already available to U.S. flag operators by providing long—term analyses of trade and maritime transport. Its two major goals were to provide: 1) ten—year forecasts of the trade of the devloping economies and the expected U.S. share of that trade, and 2) reviews of issues affecting trade and related maritime service to developing economies over the same ten—year period. In successfully completing the study, the research team: a) projected the economic growth of developed countries through 1990—1991; b) forecast world demand for 19 major primary commodity exports of developing countries and projected likely exports of each country based on existing production capacity, future plans and projected world demand; c) constructed economic forecasts for 111 developing countries to 1990 based on the historical economic relationships within each economy and projected world demand for their exports; d) estimated the volume of trade for each economy to 1990 in terms of tons by cargo category; e) determined the value of U.S. trade with developing countries ad estimated the volume of trade at detailed commodity levels; f) reviewed issues of long—term significance that affect maritime transportation of trade of developing countries, including development of national fleets, ports and inland transportation.

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SUBJECT INDEX

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